Extra copy - Wis. Forest Resource Plan

INTRODUCTION

The Scope

This strategic plan is the second of two documents to be prepared for the purpose of guiding the orderly development and use of Wisconsin's forest resource. Strategic planning looks to the future, presenting the many opportunities the forest offers to improve the social and economic structures of the state. It does so within time frames most appropriate to the respective programs and in quantitative terms wherever possible. The first document, Wisconsin's Forests - An Assessment 1980, described the current status of the resources and the major ownerships, support programs and activities related to it.

The Issues and Programs

Twenty-three public generated and reviewed issues serve as a major component of the strategic plan. An issue is a well defined area of conflict or concern which may have positive or negative ramifications on the attainment of goals. Appendix A of this document provides an abbreviated version of each of the issues as viewed by the public. A more detailed version of each of the issues is retained in the DNR Bureau of Forestry planning files.

The five program's contained by this strategic plan evolved, largely, from the public issues. The programs were developed for the purpose of resolving the issues wherever available data and information permitted. The only programs addressed herein and not referenced as a specific issue dealt with wildlife and human and economic development. No program was prepared for the fishery resource because, like wildlife, it was not referenced as a forestry issue and because its relationship to the forest resource is of minor management concern. Forest management practices may, however, have considerable affects on both fish and wildlife resources. The five program areas decided upon for the strategic plan, in order of their appearance within the plan are:

1. The Timber Resource
2. Forest Related Activities
   a. Wildlife
   b. Recreation
   c. Research
   d. Private Forestry
   e. Forest Protection
   f. Tree Nurseries
   g. Forest Survey
3. Information and Education
4. Other Forest Resource Activities
5. Human and Economic Development

Goals

A goal is an attainable point in a long-range plan or program, a brief and specific statement of a mission that may have its origin in accepted need, in law or common acceptance.

This plan for Wisconsin's forest resource presents goals under seven general headings relating to timber, protection, energy, information and research, land use, human and economic development, and environmental matters.

Timber

Maintain an inventory of the forest resource through a modern data collection, storage, and retrieval system.

Intensify the management of private and public forest lands to gain the maximum yield of useful wood fiber.

Resource Protection

Reduce timber losses to fire, insects, and disease through statewide prevention, detection, and control programs.

Protect the watersheds and water quality of Wisconsin's lakes and streams by the application of proper forest management practices.

Protect the forest resource from losses caused by improper cutting practices, theft and trespass, and encroachment by uses that conflict with accepted forest resource uses.

Energy Resources

Use wood and wood residue as a source of energy for home and industry in a manner compatible with other uses of wood.

Establish the extent to which forests can be utilized for the generation of energy from solar, wind, and hydroenergy resources; including plant and utility corridor sitings.

The Forest Environment

Establish a rational program for the protection of wild and endangered resources on all forest lands in the state.

Improve environmental quality in the more populated areas of the state through support for urban forestry programs.

Develop a comprehensive program for the use of approved herbicides and pesticides in forestry practices through integrated pest management.

Information, Education and Research

Advance the interests of Wisconsin woodland owners in forestry and forest related activities.

Create greater public awareness of the need for a high level of forest protection, management, research and product utilization.

Maintain a coordinated and continuing planning program among, and for, all forest ownerships and interests.

Forest Land Use

Promote the use of mineral resources on public lands through a statewide mining policy that will protect the natural environment.

Intensify multiple use management on public forests and encourage such management on private forests.

Utilize public forest lands for recreational use wherever it is compatible with other uses and not unduly competitive with private enterprise.

Human and Economic Development

Provide an equitable system for taxation of forest lands.

Increase the marketability and promote the marketing of Wisconsin produced timber products.

Integrate manpower programs to maximize their effectiveness to accomplish public land management programs.

Encourage greater private and public investments in forestry practices to increase productivity and sustain a vigorous and diversified wood-using industry.

Recommendations

Each of the five programs have generated a number of management and administrative problems that need to be resolved to achieve a reasonable level of plan implementation. No recommendations were made for the individual programs and subprograms in the course of their preparation because there was no way the affects of these could be measured against programs yet to be prepared. In view of this, a special recommendations section was drafted in which the very numerous proposals received during assessment, issue and program development were evaluated and, wherever possible, combined to accommodate their multiprogram implications. The format used herein is to state the restructured recommendation, identify the problems, list the programs or subprograms it affects, and briefly describe how the recommendation can be implemented. Estimates of recommendation priority from the statewide perspective will also be made.

Conclusions

Wisconsin's forest resource plan represents the first statewide attempt to study the current and potential values of the resource in a comprehensive manner. Deficiencies for data and program directions among the several ownerships prevent the plan from becoming as complete as it perhaps should be. However, recognizing this to be an initial effort in a continuing process is an encouragement to resolve data and other deficiencies during the next planning generation.

The plan is not directed at any single agency or ownership group. It encompasses most forestry interests for the purposes of gaining better management of the resource, sustaining the state's forest related industries, and providing a wide variety of social amenities for Wisconsin's citizens and guests. An energetic and widely represented public participation program offers a reasonable assurance of responsiveness to the concerns of most interest groups.

Subprogram - Forest Wildlife

Introduction

Responsibility for the protection and management of Wisconsin's wildlife resources is housed in the Department of Natural Resources. The Department's adopted goal is to "Provide for healthy life systems, of which fish and wildlife are a part, recognizing biological capabilities, other competing uses of natural resources and the needs of the public"[1]. It is clear in its intent to accommodate the needs of all wildlife, game and nongame, and to react responsibly to the state's social and economic needs.

The DNR's statewide plan for fish and wildlife[1] is a management system for the Department and other fish and wildlife interests to follow to year 1985. It is a strategic plan that sets forth management objectives for 54 species, or groups of species, of fish and wildlife. One-half of these are wildlife species; several of which have a strong habitat dependency on the state's forest resource. The following discussion will dwell solely on wildlife, wildlife properties, and those wildlife management programs having a close relationship to timber production and other forest values.

Wisconsin's plan for wildlife defines the current status and projected demands for wildlife to year 1985. It also presents ways in which these demands can be satisfied through a variety of program, policy and project measures. The emphasis of the wildlife plan is on game species with concerns for non-game species allotted to only a portion of those currently listed as threatened and/or endangered. The plan, however, does not contain an evaluation of the impact of wildlife or wildlife management objectives on other land (forest) values. The omission is understandable considering the inadequacy of up-to-date forest resource data available at the time the plan was prepared. Fortunately, planning that has been done for fish, wildlife and recreation and is being done for forestry will serve to make wildlife's objectives more attainable.

This subprogram will address concerns for game and non-game wildlife species, timber management and wildlife, wildlife conflicts and forest-wildlife opportunities. It will be somewhat more descriptive than other program and subprogram elements because wildlife was not exposed to issue analysis as were most of the other forest values. The absence of a wildlife issue among the 23 generated by the public does not infer that the wildlife program is without issues. Wildlife specialists identified several of statewide concern in the wildlife plan involving the increasing human use of land and water resources, growing demand for wildlife recreation, lack of public understanding of wildlife needs, inadequacy of wildlife supply and demand data, and the increasing costs of wildlife management.

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[1]Comprehensive Fish and Wildlife Management Plan, Wisconsin Department of Natural Resources, 1979.

Some of the problems common to forestry, wildlife and other land management interests have been reduced by guidelines for habitat management and protection developed by the DNR. The guides, though primarily developed for application on state and county forests, are suited to application on all forest lands. They serve to modify timber and recreation management practices on areas where the potential for harm to wildlife is greatest. Modified timber management is thus applied to deer yards, in critical timber types where edge and openings are in short supply, and in osprey and eagle nesting areas. Another guide prohibits the development of snowmobile trails in or near winter deer yarding areas.

Other problem alleviating land management activities for wildlife include seeding of logging roads; preservation of den, mast and large trees; development of access for hunter and manager; modification of timber sales in size, timing and shape; planting of conifers for cover; and regulating timber sales to induce sprouting.

Formal and informal agreements covering the guides and the preceding activites exist between the DNR and county, industrial and national forests. To what extent the elements of the agreement are carried out depends to a great extent on the working relationship established between the land manager (often a forester) and wildlife manager. The most wildlife agreement deficiencies exist on the smaller, privately-owned forests even though DNR foresters are instructed to make it a standard practice to encourage a consideration for wildlife in all contacts with owners. Most private owners who have been so advised respond favorably to the encouragement. However, considerably greater wildlife management direction should be extended to the numerous forest landowners who are currently not recipients of any type of professional forest or wildlife management advice.

Game Species of Wildlife

Appendix C contains a listing of the forest game birds and animals most sought after by Wisconsin hunters and trappers. It is for this group of wildlife that most management effort is directed. Although there is a wide variety of wildlife inhabiting the state's forests, only a small percentage of them are of importance to hunters and trappers.

License sale revenues (resident and non-resident) from hunting and trapping totalled about $14 million in 1980. It is estimated that about 75 percent of all hunting license purchasers depend primarily on the forest resource to accommodate their hunting experience. If license sales data can be considered suitable criteria for measurement, then hunting demands have not exhibited an overall increase since 1978[1]. A part of the fluctuation in demand over a long time period can be attributed to hunter success; a condition that is usually of greater importance in localized situations than statewide. White-tailed deer hunting, for example, has increased in popularity in parts of southern Wisconsin due to higher deer populations and improved hunter success and has decreased in popularity in the north for the opposite reasons. The vast accessible public forest resource in the north apparently is not, in itself, important enough to attract deer hunters away from high success areas.

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[1] An increase in license fees in 1979 caused an immediate drop in sales but a gradual upswing is now in evidence.

Wisconsin has enjoyed excellent forest game harvests for several years because of good wildlife management policies and the provision of a favorable environment for wildlife by wildlife and forestry interests. Deer and grouse, the most sought after forest game species, have been most abundant in recent years.

Net revenues to the state's economy from wildlife are measured in terms of in-state non-resident expenditures (licenses, food, shelter, transportation, etc.) and the value of the products harvested by resident hunters and trappers. Non-resident license expenditures and other non-resident Wisconsin expenditures were estimated at about $6.3 million in year 1980. Resident hunters bag about 97 percent or 145,000 of the 150,000 deer harvested annually in the state. The resident harvest converts to field dressed venison with an estimated sale value of $7.25 million ($.50/lb. field dressed).[1] No estimate was made of the harvest value of bear and small game. The value of pelts taken by trappers in 1980 was estimated at $15 million. The 1980 net revenue to Wisconsin for hunting and trapping is an estimated $28.5 million.

Some values of forest wildlife cannot be measured in dollars and cents. These pertain mostly to their value to the state's recreation industry for the viewing pleasure they provide and to those members of society who simply enjoy observing and studying wildlife in a natural, undisturbed setting.

Wildlife, particularly deer, may cause social and economic problems. For example, in some locations and under certain circumstances deer can be highly destructive to agricultural crops and to natural plant succession (including woody plants) in the forests. They also cause other damages, like to a reported 12 to 14 thousand motor vehicles annually, and are sometimes carriers of diseases that can be infectious to domestic livestock and humans.

Other problems exist, not forest related, that effect game management and hunting and trapping activities. Among the more significant are:

1. the unethical hunter or trapper who violates the privilege of using the lands of others

2. the inability to control hunting and trapping pressures to the level desired.

3. an absence of data upon which to make undisputed management decisions

4. the overabundance, to the nuisance level, of animals in some areas

5. a general public misunderstanding of wildlife dynamics and management principles

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[1] Field dressed venison is currently sold by DNR for $.30/pound.

6. the difficulty of managing wildlife at an optimum level to the satisfaction of all and under the constraints of broad, geographically imposed hunting and trapping regulations

7. the inability to accurately measure the affects of other uses of the forests on wildlife production and hunter and trapper satisfaction

Non-game Species of Wildlife

This group of wildlife represents, by far, the largest segment of the state's wildlife population and includes mammals, birds, reptiles and amphibians. There are few management programs aimed at the perpetuation of these species mostly because they have been able to adapt reasonably well to changes in the forest environment and because they have not been intensively pursued by man for sport or profit. Exceptions to this are those species whose populations are, or soon will be, in jeopardy. These are the endangered and threatened species of the forest (see Appendix D for listings of these species) about which most of this discussion will be directed. Legislative authority to develop a program for the protection and perpetuation of this select group of wildlife species was given to the Department of Natural Resources in 1978.[1]

Problems relating to endangered and threatened and other non-game species mangement include losses or alterations of habitat, inadequate inventories, a lack of public interest in species management (especially on privately owned lands), an inadequate amount of consideration in pubic and private land use decisions and a shortage of funds for management purposes.

Non-game wildlife generates little or no net income for the state but they are a vital part of the forest ecosystem and of concern to people interested in the study and observation of natural plant and animal communities. Values of non-game wildlife species in the forest ecosystem cannot be challenged but are most often misunderstood.

Timber Management and Wildlife

Forces concerned with the production of wildlife and timber have not always been able to align their goals and objectives to their mutual satisfaction. Major obstacles to achieving this end have been the absence of long range planning and the manipulation of habitat for one or the other purpose; manipulation that from the forestry perspective involves reforestation, timber harvest and timber stand improvement and from the wildlife perspective involves opening management, vegetative diversity and young (low canopy) forest maintenance. The most obvious need is for an integrated management program that establishes reasonable objectives for both wildlife and forestry and then follows through with management prescriptions to attain those objectives. Integration in this reference is called for on all commercial forest lands including those retained primarily for wildlife production.

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[1] Wisconsin Endangered Species Law (Section 29.415, Wis. Stats.)

Wildlife and timber production interests can look to some initiatives as an immediate response to an integrated program. These include:

-- a better understanding of the current and projected management objectives of wildlife and forestry interests within management units (or compartments) throughout the state.

-- a better understanding of the timber and wildlife status and potentials on forested tracts; a product of improved forest inventory procedures

-- a system of modified timber and wildlife management applications

-- an improved access program

-- an increase in the use of fire management for the propagation of wildlife and the establishment of new forest growth

-- a more comprehensive program for the protection of threatened and endangered plants and animals

-- further sophistication in long range plans related to wildlife and forestry

-- more research directed at timber and wildlife productivity

-- a better public awareness of the interrelationship of forests and wildlife and of their respective social and economic benefits

More specific opportunities to improve conditions for forest wildlife are contained in the following paragraphs.

Non-game Birds

Not much can be done beyond what is now being done to maintain non-game bird habitat in Wisconsin's forests. Timber management programs, controlled fire and rights-of-way construction represent a few of the more important activities taking place to maintain habitat diversity and a favorable edge effect. Forests having the greatest diversity of structure generally have the greatest diversity of bird life.

Land management activities, whether for timber or wildlife production, can be conducted so as to increase bird habitat. The key is to maintain a diversity of timber species and age classes, as much edge as possible and recognize that some species of birds, like hole nesters, have specific habitat requirements. Plans should maintain inventories of non-game bird species and identify how these inventories are affected by land use (management) decisions.

Aspen Management

Current programs to maintain aspen types are favorable to both wildlife and timber production and should be continued. There are, however, opportunities to expand aspen type management to other acreages and to alter traditional aspen management practices to gain additional benefits to both timber and wildlife interests. Hybrid aspen reforestation and intermediate commercial and/or non commercial cuts are two such innovative opportunities. The maintenance of aspen types in Wisconsin's forests is essential to game and non-game wildlife and to wood using industries.

Firewood and Wildlife

The gleaning of dead and cull trees in the forests of southern Wisconsin is looked upon by many as highly detrimental to wildlife. A direct action to stop this practice is not now feasible, but a landowner education program describing its harmful effects and offering ways in which wildlife populations can be maintained could alleviate the problem. The oak woodlot is particularly susceptible to wildlife losses from fuelwood harvesting.

Landowner Management Objectives

Many landowners retain their forests for recreation and wildlife benefits to the total exclusion of timber production; a decision that is often self-defeating. Wildlife and forest managers should, together, exercise the opportunity to advise these landowners of the ways in which recreation and wildlife values can be enhanced by timber harvest even though timber harvest may be of lower priority to them than wildlife. The result would be increases to both timber and wildlife production in the private ownership sector.

Conifer Reforestation

There is reasonably good evidence that conifer reforestation activities will be accelerated in the future to accommodate state, nation and world shortages of softwood fiber. The acceleration can occur with or without consideration for wildlife depending upon how well we respond now to the pending situation. As an opportunity, wildlife and forestry interests can establish plans, policies and procedures related to reforestation that would minimize adverse affects on wildlife and, perhaps, in some cases be to its benefit. A major obstacle to overcome, or react to, is the inability to influence land use decisions on a large percentage of the forest land in the state; land in private ownership.

Wildlife Lands

Although the reconnaissance of timber resources on DNR wildlife lands is incomplete, that portion surveyed to date reveals excellent opportunities for timber management, including reforestation. Department foresters have the responsibility to carry out such management with modifications as may be in the best interest of wildlife. The average annual timber harvest from

wildlife properties can easily be increased beyond the present 1.5 million cubic feet. Annual growth can likewise be increased by the installation of compatible timber management practices.

Endangered and Threatened Species

Timber management practices that enhance endangered and threatened species (plant and animal) habitat should be instituted wherever it is feasible to do so. An identification of the area to be managed and the type of management prescription to be applied would be required. An absence of habitat inventory information severely limits endangered and threatened species management opportunities. Eagle and osprey nesting sites are currently inventoried by an established DNR procedure.[1/] The procedure is applicable on Department and non-department lands and is to be carried out by all Department employees.

The Impact of Forestry and Other Activities

Studies are needed that would provide reasonable guides to the effects of forestry, recreation (other than hunting), wilderness, and selected other activities on wildlife production. The gains and losses to wildlife by forest land dedications or applied uses are, at best, difficult to estimate and the conjecture surrounding estimates seldom aid the management, or use, decision. The timber resource program, for example, calls for large acreages of hardwood intensive management yet there are no estimates of how this may favorably affect wildlife within the hardwood types to be worked.

Wetlands

The abundance of wetland habitat in most Wisconsin forests sometimes obscures their value for wildlife production. Management plans drawn for forests containing wetlands (forested or non-forested) must recognize these values and provide them a reasonable level of protection. A special emphasis on protection is needed in those forested regions having a short supply of wetlands.

Comprehensive Planning

Wisconsin's comprehensive wildlife (and fish) and outdoor recreation plans have established long range goals and short range objectives for the production of forest wildlife and satisfaction of hunting demand. These plans strive to maximize wildlife production in relation to hunting demand but not in relation to other forest values. However, the presence of well defined programs, including forestry, present the opportunity to attain wildlife production at a desired level and to project the affects of other forest activities on the program. They, for example, allow for the gains and losses to wildlife production, hunters satisfaction, and timber production resulting from land use and management decisions to be reasonably well-reflected in the planning and decision-making process.

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[1/] Dept. of Natural Resources Manual Code 2328.1.

Sub-Program: Outdoor Recreation

Introduction

Wisconsin's commercial forests provide for a multitude of recreational activities; some activities having a large number of participants and others only a few. Most recreation is of the dispersed variety; requiring only modest improvements, if any, and avoiding the clustering of people in restricted areas. As a group, dispersed activities have an inconsequential effect on the overall forest environment and rarely conflict with other forest management objectives (timber production, wildlife habitat maintenance, etc.). Hunting, fishing, hiking and ski touring are examples of popular dispersed activities in Wisconsin.

In addition to contributing to the provision of dispersed activities, Wisconsin's forests provide the backdrop for a wide variety of activities requiring intensive facility developments. Picnic areas, campgrounds and swimming beaches are typical of developments in this category. Intensively developed areas contained within the forests most often lessen timber management opportunities, reduce wildlife potentials, and have a negative affect on the natural environment of adjacent stands of timber. These buffer areas vary in their importance to other management objectives depending on the level of use and size of the developed area.

Appendix A contains an analysis of outdoor recreation (intensive and dispersed) as an issue related to timber productivity. The analysis revealed that recreation as currently perceived was of minor consequence to productivity and not an issue to be cared for in the negative sense. Overall, recreation is now considered to be a benefit of the forest that can be realized without significant detriment to the other major forest related activities.

The goals and objectives of the various forest land ownership categories largely determine the extent of their respective involvement in the provision of recreational opportunities. National and state forests have the strongest commitment followed by county, industrial and private non-industrial forests (PNIF). The latter group may often restrict public access entirely leaving the focus of recreation on the desires of the landowners and their guests. The inclusion of recreation in ownership goals and objectives may also be constrained by the absence of an attractive recreational resource base. With some exceptions, the overall low level involvement in developed recreation by the counties can be attributed to limited or unsuitable resources. Many of the state's most attractive recreational resources are already contained by public parks programs.

Supply

It is reasonable to assume that nearly all of the 4.8 million acres of public forest land in Wisconsin are available for dispersed kinds of outdoor recreation activities and that most of the 1.1 million acres of industrial forest land are also available. The only assured public acces to PNIF ownerships is provided on those .3 million acres of PNIF land entered under Wisconsin's Forest Crop Law, a law that guarantees public access for hunting and fishing.

There are no intensively developed recreation areas on the 14.5 million acres of commercial forest in the state in as much as these areas have been set aside for a use other than timber production. From the planning standpoint, the acreages of the buffer areas bounding intensive developments on which timber and wildlife production have already been lowered and the acreages having a reasonable chance of being developed intensively in the future are more important than deductions made previously.

Appendix Table C-3 in Wisconsin's Forests - An Assessment, 1980, describes the camping, trail, picnicking, swimming and boating facilities available within national, state and county forests. Facilities provided within both categories of the private sector have been determined on a statewide basis in the 1981 State Comprehensive Outdoor Recreation Plan but, there is no correlation between these numbers and the actual amount provided within their commercial forests. The need for arriving at these numbers would be only for arriving at an estimate of the acreage of forest having a reduced capacity to produce timber or wildlife.

Demands

Recreational use of national and state forests has, overall, increased substantially between 1970 and 1980 and will likely continue to increase at a moderate rate to the year 2000. Rapid increases are not projected because of escalating travel costs, a stabilizing census of population, and because the supply of recreation areas and facilities will probably not experience large increases. Recreational use of commercial forest land in other ownerships is estimated to have increased at the same rate as national and state forests between 1970 and 1980 and, will likely be influenced by the same constraints in the future. Because of the nearness of the major sources of out-of-state demand, there is not expected to be a significant change in the proportion of resident to non-resident users. There now are about 10 to 15 percent more residents engaged in the common forest type recreation activities than non-residents.

The wilderness experience as a new to Wisconsin recreation form has not resulted in a significant number of users despite the large acreages of commercial forest set aside, or under study, for the purpose. It is estimated that hunters and fishers now utilize wilderness areas in greater numbers than the true wilderness participant. Current and projected demand for wilderness in Wisconsin is in need of further investigation to gain not only a better grasp of participation numbers but also what the potential participant desires in the way of wilderness experience. The affects of wilderness on other forms of recreation and wildlife and timber production could be significant in the future. The state's forests have several characteristics that reduce their ability to provide a good wilderness experience.

Recreation Program Constraints

There are several constraints related to the provision of recreational opportunities, analyses of recreational supply and demand and the determinations of recreational program directions that should be resolved to clarify the future role of the forests in the statewide recreation program. Some of the more important known constraints are contained in the following:

1) There is no continuity among the ownership groups in measuring recreation participation (demand) and supply and in analyzing recreation needs. A major concern herein relates to definitions of supply and demand.

2) Wisconsin's predictions of demand are based largely on current demands and participation rates within current and projected census of population estimates. Predictions of this type fail to consider changing desires of people, innovations within recreation activities, and other demand influences like changes in recreation resource (land and water) quality and recreational costs. They are, therefore, occasionally inaccurate for short time periods and must be adjusted for short term decision making. However, they are most often reasonably accurate in identifying trends in participation over a long time period.

3) Supply and demand data contained in the State Comprehensive Outdoor Recreation Plan (SCORP) is described in total and does not have a specific relationship to the commercial forest base. Therefore, assignments of such data to the forests can now only be by best estimate.

4) Forests in private non-industrial ownership (PNIF) provide fewer recreational opportunities than public ownerships, on an acre for acre basis, for several reasons.

   a) The cost of investment and rate of return for most forest oriented recreation development does not result in a reasonable profit and thus is unattractive to the PNIF owner.

   b) Some PNIF owners choose to use the recreational potentials of their lands for their own purposes, to the exclusion of others.

   c) The concept of "user pays" that sustains much of the recreational demand on public lands is not always applicable to PNIF lands, particularly for dispersed types of activities.

   d) Public access to private lands is often restricted by no trespass posting and/or by a reluctance by recreationists to enter onto private lands when not posted against entry. Permission to enter onto unposted land is usually hard to obtain because the owner cannot be easily located. The absentee owner poses a most obvious problem for the recreationist.

   e) A portion of the demand, the handicapped recreationist, may not be as well provided for by the private sector as by the public.

5) Other uses of the forests like mining, wilderness, and wildlife and timber production can conflict with the demands of recreationists by disturbing the existing landscape, restricting access, etc. The extent, or level, of conflict is often determined by the management prescription assigned to the conflicting activity.

6) Some forest ownerships are unable to fully engage in the provision of recreation due to legal constraints. The nearly 1.3 million acres under the Forest Crop Law, for example, can be used for hunting and fishing but intensive forms, requiring on-site and space demanding improvements, would conflict with the intent of the law. Outdoor recreation restraints are also implied in the County Forest Law.

The Program

Ownership Roles

Public Forests

None of the major public forest land ownerships are expected to significantly increase their supplies of intensively developed recreation areas by the year 2000. Emphasis will continue to be on the provision of dispersed recreation activities. Statewide demands for dispersed activities are expected to increase by about 10 percent by the year 2000; a modest increase that is not expected to negligibly affect the public forest resource.

The public sector will continue to carry on most of the long range, comprehensive recreation planning. Such plans will, however, serve to guide both public and private involvements in the provision of recreation opportunities. Added emphasis on public involvement in the preparation of these plans will provide private enterprise more assurance that its concerns are being recognized.

Private Forests

Private recreation enterprise is expected to play a greater role than the public sector in the provision of intensively developed areas utilizing the forest resource (publicly and privately owned) as a support feature for the activities offered. Even here, however, the modest predicted increases in demand for important facilities, like campsites, will have little affect on the other values of the commercial forest.

Public access to PNIF lands for dispersed recreation is not expected to improve by the year 2000 despite public agency efforts (programs) to do otherwise. Main reasons for this are the continuation of land divisions that result in smaller and smaller parcels, the increase in the number of absentee landowners, landowner liability fears, property vandalism, and the desire of landowners to use their lands solely for their own recreational purposes.

Forest lands held by industry for timber production will likely continue to be available for public dispersed recreation and industry will likely make modest investments in improvements to accommodate the public in pursuit of dispersed activities.

Role of Government

General

Governmental influence on outdoor recreation will continue in the enactment and enforcement of laws designed to protect the resource base for recreation as well as other social values. However, such influence may not always be favorable to all forms of recreation. The management of public forests will continue to recognize recreation as important and necessary in all land use decisions.

Some governmental actions may not directly affect the resource base but, nevertheless, can affect recreation participation. Actions like highway improvements that improve access and changes in user fees, for example, may alter the behavioral patterns of recreationists as much, or more, than, for example, a decision to construct a new campground.

Wilderness

Wilderness is treated, herein, as a resource use for the purpose of providing a recreational experience. It is in response to government decisions that influence federal and state lands in Wisconsin. It impacts on commercial forest land and other lands within these ownerships and affects all other types of major land uses like timber production, traditional recreation, and wildlife production. The future of the statewide wilderness program will be threatened by growing demands of other forest users and by the small amount of use being made of existing wilderness areas.

The amount of commercial forest land now devoted to wilderness in Wisconsin totals a little less than 29,000 acres. An amount that does not, in itself, appreciably deplete the resource for other management purposes. However, another 40 to 50 thousand acres of federal and state forest land now under study for wilderness designation would, if approved, measurably affect other forest uses.

Subprogram: Forestry Research

Introduction

The increasing demands being placed on Wisconsin's shrinking forest resource provide good justifications for a forestry research program that can make each acre more productive and place every land manager in a position to make better management decisions. Within its overall initiative, research simply strives for the better management and protection of air, land and water resources.

In Wisconsin, forestry research is co-sponsored by public agencies, forest industries and public educational institutions. The actual conduct of research is cared for by U.S. Forest Service Experiment Stations and public universities. Most of the current forestry research in the North Central Region has been programmed by a Joint Task Force of the U.S. Department of Agriculture and National Association of State Universities and Land Grant Colleges in their 1978 publication titled "Program of Research for Forests and Associated Rangelands." A goodly portion of the materials used in this research subprogram were taken from this document including the following seven major categories for forest research emphasis:

1. Multi-resource inventory, appraisal, and evaluation
2. Timber management
3. Forest protection
4. Harvesting, processing, and marketing of wood products
5. Forest watersheds, soils, and pollution
6. Forest range, wildlife, and fisheries habitat development
7. Forest recreation and environmental values

Forest research is most often a reaction to an expressed need rather than the exclusive product of a research program. The twenty-three public forestry issues generated early in this planning process revealed a variety of research needs which were condensed and alluded to in a single issue related specifically to forest research activities. Appendix A provides an abbreviated version of this and other issues.

The 1978 Joint Task Force report predicted that 389 Scientist Years would be needed to meet North Central forestry research needs in year 1985. This is a need that has probably not changed significantly during the ensuing years. Not all of the research called for in the 1978 report is of interest to Wisconsin forest managers and part of it would be of rather low priority.

Forest Research Opportunities

Research opportunities are virtually limitless; continuing to increase in number in a direct proportion to the growing complexity of the overall forestry program. The briefly stated opportunities described in the following discussion are those identified by investigators and through the public's involvement in forestry issues. They represent those opportunities of greatest relevance to the Wisconsin's forest resource, related industries, and primary resource users and are presented, as appropriate, under the seven major categories of research emphasis.

1. Multi-resource inventory, appraisal and evaluation.

   a. Attainment of a better perspective of the attitude of private landowners toward the management and use of their forests.

   b. Determination of the magnitude of wood for energy harvested from growing stock inventories.

   c. Determination of ways to accurately and economically obtain and utilize forest resource supply and demand data.

2. Timber management

   a. Determination of the potentials of biomass plantings in relation to species preferences, management techniques, and risks.

   b. Development of new reforestation methods, with special consideration for the replacement of aspen-birch and oak-hickory types with conifers.

   c. Identification and development of environmentally acceptable herbicides for use in site preparation and conifer release.

3. Forest protection

   a. Identification and development of environmentally acceptable insecticides and fungicides for the control of damaging insects and diseases.

   b. Development of a means to implement and monitor an integrated pest management program.

   c. Development of methods of suppressing forest fires more effectively and economically.

4. Harvesting, processing, and marketing of wood products

   a. Development of new uses for wood fiber especially to obtain better utilization of low value timber products and for substitutes for the traditional manufactured wood products that cannot be adequately sustained by the future forest resource.

   b. Determination of ways to achieve greater utilization of wood fiber during harvest operations.

   c. Investigation into how logging equipment and procedures can be altered to reduce damages to the residual resource (timber, soil, other vegetation, and water).

   d. Investigation into the methods by which harvested forest products can be delivered to primary purchasers more efficiently.

   e. Development of ways to improve the marketability of forest products harvested by the small woodland owner.

5. Forest watersheds, soils, and pollution

   a. Establishment of ways in which forests and forest management practices affect wind and water induced soil erosion.

   b. Determination of the importance of forests in influencing the quality of ground and surface waters.

   c. Investigation into the affects, harmful and beneficial, of acid rain on forest vegetation.

6. Forest range, wildlife, and fisheries habitat development

   a. Investigation into the relationship of various forestry practices on game and non-game wildlife species.

   b. Determination of the minimum habitat requirements needed to maintain viable wildlife populations.

   c. Development of management procedures to protect threatened and endangered wildlife species.

7. Forest recreation and environmental values

   a. Determination of the impact of users of dispersed recreational opportunities on other uses of the forests and the forest environment, including wilderness areas.

   b. Determination of ways in which the physical and biological affects of ATV's and ORV's on the forest can be measured and predicted.

   c. Determination of ways to identify and react to social constraints and values that effect management decisions.

The fulfillment of these research opportunities will be largely dependent on the adequacy of research funding and the level of accomplishment attainable by the research agencies. To some extent, it will also depend on the degree of importance placed on research opportunities identified in the future and the priority put on them for study. The program must remain flexible to be able to react to research needs of an emergency nature when they arise.

11700

Subprogram - Private Non-industrial Forests

Introduction

Private non-industrial forest (PNIF) owners, about 160,000 in number, control nearly 9 million acres (60 percent) of Wisconsin's commercial forest base and about 58 percent of the volume of growing stock timber. They obviously will play as an important role in deciding the destiny of the state's wood using industries as they have in its history.

This subprogram relates directly to seven of the twenty-three public issues generated early in the planning process. The issues in question concern timber acreage losses due to landowner attitude, forest land taxation, needs for forestry practices on PNIF lands, timber sales, public awareness, the abundant hardwood resource, and the status of funding and technical services. More detailed discussions of these and other issues that affect PNIFs to a lesser degree are provided in Appendix A.

The major participants in the subprogram, in addition to the landowner, are consulting industrial foresters and DNR service foresters. Their contributions are reflected herein in timber outputs and improvement programs, in wildlife production, and in recreation activity outputs.

Current Program

Because of the large number of private owners with individual objectives, there is no precise forest resource management analysis that can be applied to this ownership category. The program, therefore, must be dealt with in terms of averages and calculated assumptions.

Measurements of the magnitude of the current program are incomplete largely because the private owner has no inter-ownership system for reporting needs and accomplishments. The most complete reporting procedure is carried on by DNR service foresters who record reasonably accurate and uniform data on management planning, timber sales, timber stand improvement, tree planting and timber utilization assistance on the lands they service. The data is reported in terms of number of services performed, acreage cared for and timber volumes involved. Table _____ describes the magnitude of service forester accomplishments for years 1977, 1978 and 1979; years that are fairly representative of the scope of DNR involvement.

Table ____. Wisconsin CFM Accomplishment Summary for the Years 1977, 1978 and 197[1]

Activity	Measurement Unit	Program Years 1977	1978	1979	Total	Average
Management Plans Prepared	No.	1,437	2,058	1,944	5,439	1,813
Timber Sales Harvested						
Sawtimber	No.	313	302	273	888	296
	Acres	7,354	7,309	6,901	21,564	7,188
	MMBF	22.1	15.8	19.1	57.0	19.0
Pulpwood	No.	152	177	151	480	160
	Acres	3,746	3,990	2,983	10,719	3,573
	Cords	32,798	37,194	32,437	102,429	34,143
Timber Stand Improvement	No.	361	450	383	1,194	398
	Acres	3,069	4,216	3,615	10,900	3,633
Tree Planting	Acres	10,115	13,348	13,412	36,875	12,292
Utilization Assistance Requests	No.	101	178	228	507	169
Total Field Requests Serviced	No.	8,766	9,337	8,779	26,882	8,961

[1] Based on these three years of accomplishment

Source: Wisconsin's Forests - An Assessment, 1980; DNR.

The estimated 30 to 35 forestry consultants in the state provide essentially the same type of service for the woodland owner as the DNR service forester except that the consultant can play a greater advocacy role for the owner in such matters as timber sales and the provision of legal advice. The magnitude of consultant forester services is unknown.

Industrial foresters also assist the PNIF owner through the Tree Farm and Tree Farm Family programs and by providing management advice upon request to owners outside the two programs. Landowner solicitations by industrial foresters are largely associated with wood procurement. This does not include, however, their Tree Farm program activities which are more closely aligned to landowner education and total forest management. There were about 1,500 Tree Farm cooperators with about 1.6 million acres of woodland in the state in 1979.

Financial and technical forestry assistance is provided the PNIF owner through three federally subsidized programs. The Agricultural Conservation Program (ACP) and Forestry Incentives Program (FIP) provide cost-share assistance for reforestation and timber stand improvement and the Rural Forestry Assistance (RFA) program provides free DNR forester technical assistance. The state financial contribution to the RFA program far exceeds the federal contribution. However, the state makes no contribution to the carrying out of project measures on PNIF lands as does FIP and ACP.

The current PNIF assistance programs, regardless of sponsorship, are helpful to the private forest landowner but they do not resolve all of the concerns connected with the long term commitment to resource management present within this ownership category. These current concerns relate to:

1) Forest land subdivision -- the size of the average PNIF ownership is now about 56 acres but further land subdivisions expected to occur by year 2000 will likely reduce the average size to a level below which timber management may lose importance to other uses.

2) Liquidity -- forest land generally cannot be converted to other forms of capital, including cash, with the same ease as other investments. Although this may be favorable in that it tends to restrict activities of speculators, it also serves to limit the activities of forestry minded investors who for financial reasons must retain an easy disposal of investment option.

3) Investment opportunities -- the long time period between investment and return in forest land management is unacceptable to many PNIF owners and, therefore, causes many woodlands to go lacking in needed improvements or be subjected to uses other than forestry that promise earlier returns.

4) Ownership turnover -- PNIF forest lands are estimated to change ownership at 10-year intervals. This circumstance not only dampens incentives for long term investments but it is also accompanied by the risk that the new owners will have no interest in timber or wildlife management or public outdoor recreation. It is estimated for example, that about 2 million of the 8.65 million acres in this ownership category will not be subjected to timber harvest by year 2030 because of landowner disinterest in timber harvest.

5) Forest pests -- PNIF lands are particularly vulnerable to insect and disease damages because control measures are difficult to apply on numerous and scattered ownerships and because over-mature and defective timber resulting from a no-cut attitude creates an above normal risk condition.

6) Forest land taxation -- forest lands are often assessed on the basis of values other than timber. In all cases these values, like recreation and residential, are greater than timber which results in the leveling of a property tax too high to be assumed by forestry interests. The Forest Crop and Woodland Tax Laws have served to lessen the affects of these assessments on about 14 percent of the forest land in industrial and PNIF ownership in Wisconsin.

7) Losses of forests to other uses -- a very large part of the 4,500 acres of forest land lost annually to other uses is in PNIF ownership. These losses are mostly attributed to agricultural and residential developments.

8) Uninformed landowner -- Many landowners are unaware of the benefits to be derived from the managed forest or of the programs available to aid in making a managed forest a reality. The Information and Education program presented in this report addresses the uninformed landowner problem in greater detail.

9) Marketing -- few PNIF owners have access to up to date marketing information related to current stumpage prices, type of roundwood products in demand, and timber buyer availability. Landowners are also hesitant to negotiate the sale of standing timber or cut products because of logger/buyer distrust and in the absence of reasonable investment security (sale contracts) Appendix A contains a brief description of an issue dealing with timber sales that confronts these problems.

10) Financial assistance -- both FIP and ACP provide sufficient financial incentives to private landowners for ongoing reforestation and forest improvements but neither program is adequately funded to meet the needs of an accelerated timber productivity program. Another problem of financing is related to the lack of long term investment protection that could be provided by timber crop insurance.

11. Technical assistance -- current technical assistance programs as provided by DNR, University of Wisconsin - Extension, consulting foresters, and forest industries are inadequate. The overriding problem is a lack of technically trained personnel to do the job at the level of intensity and quality needed.

12. Landowner commitment - there are few guarantees that the public investment in financial and technical services on PNIF lands will result in the production of wood fiber for society's benefit. An absence of such assurance jeopardizes continuation and expansion of programs like FIP and ACP.

13. Other uses of forests - PNIF owners, for sometimes justifiable reasons, prohibit some or all forms of public use and multiple benefit management on their lands. The affects of prohibitions of this kind are most adverse to the satisfaction of outdoor recreational demands, production of game and nongame wildlife species, protection of environmentally sensitive areas, and perpetuation of areas of high aesthetic value.

14. Merchantability -- a part of past and current investments in forestry programs have not resulted in the growth of products that can be readily harvested. This situation is illustrated by the numerous small, scattered conifer plantations throughout the state, but particularly in the south, that are not productive enough on an individual basis to be economically or technically harvested or managed.

Private Forestry Opportunities

The opportunities described herein may not be totally adaptable to all PNIF owners nor are they intended to occlude the owner's personal preferences on how the lands will be managed or from where management responsibilities will be directed. Their purpose is only to identify what might be accomplished if certain management decisions are made and if certain supportive actions are taken. What follows is a description of those decisions and actions that can be taken by the public and private sectors to achieve a greater involvement in forest land management by the private owner. Fulfillment of the opportunities should begin as soon as possible.

*Timber Production -- The Timber Resource Program reveals the current annual yield (growth) from softwoods and hardwoods on PNIF ownerships amounts to about 308.76 million cubic feet and that an accelerated forestry program at the high level alternative can increase annual yield by 132.52 million cubic feet, to 441.28 cubic feet. The annual cost of accomplishing this alternative is estimated at $3.15 million (based on the value of the 1979 dollar). Standard and low level alternatives for increased productivity are also described in the Timber Resource Program and can be calculated at 75 and 50 percent, respectively, of the high alternative for both productivity and cost. The high level alternative will serve as the base for the following analysis of PNIF owner opportunities.

Reforestation of softwoods is projected to be the most productive and costly PNIF acceleration activity. Over a 45 year period, 1.387 million acres have been identified for treatment. By year 2030 these acreages are expected to be producing about 93 million cubic feet of softwood fiber annually. The total cost of reforestation for the 45 years is estimated at $105.3 million. The annual acreage to be planted is nearly 31,000 acres, or about 2 1/2 times the current amount. The effects this acceleration would have on current programs are not possible to determine due to the absence of data from some sources of technical service (consultants and industrial foresters). However, if DNR service foresters were expected to care for their previous share of accelerated reforestation, it would mean an increase in current involvement by 2 1/2 to 3 times.

Intensive management (TSI) of softwoods and hardwoods at the high alternative would involve a treatment of slightly more than 104,000 acres annually (7,000 acres of softwoods and 97,000 acres of hardwoods) at an estimated cost of $810,000. The total yield from this effort would amount to 39 mm cubic feet of wood fiber in addition to the 309 mm cubic feet the hardwood and softwood types in this ownership are currently producing. The added yields described herein would result from a 10 year softwood program and 20 year hardwood program. Currently, DNR service foresters are recording intensive management accomplishments on about 3,600 acres of timber land annually, or only about 3 percent of the total projected as needed each year by the Timber Resource Program. Consulting and industrial forestry staffs and private landowners by their own initiative add to the intensive management acreages but not in amounts sufficient enough to make significant inroads into the 104,000 acres of annual need. It should be noted that intensive management does not incur overhead costs, like interest charges, nor does it effect annual costs of ownership (taxes); it only serves to increase the value of the stand of timber.

PNIF landowners also need to accelerate timber harvest operations to meet 80 percent of their allowable cut of their growing stock timber. To achieve this would mean an approximate 33 percent increase in timber harvest activity (this ownership group currently meets about 60 percent of its allowable cut) and substantially more technical forestry service, particularly from consulting and industrial sources. It is also true that a part of the current harvest is not reflective of good cutting practices which, philosophically, would call for even more technical services.

The preceding discussions of reforestation, intensive management and timber harvest present several opportunities for overall program improvement. These include:

a) a greater involvement in PNIF activities, particularly timber harvest, by consulting and industrial forestry staffs.

b) an increase in FIP and ACP financial assistance.

c) additional public foresters, mostly DNR (about 12 person years), to meet the large backlog of service requests and those anticipated by accelerated programs.

d) a greater devotion of DNR forester's time to timber management activities (only 54 percent of the time is now spent for these purposes).

e) an increased public awareness program by all forestry interests, but largely by UW-Extension.

f) the establishment of custom crews to carry out timber stand improvement practices.

*Improved PNIF Landowner Attitude -- This can be largely achieved by two basic measures.

The first is well described in the Information and Education Program which calls for an increase in public trust and an understanding of the importance of forest management to the economy and to society. Public awareness must also cultivate respect for the forest resource.

The second measure involves a realization that the PNIF owner often holds forest land for purposes other than timber production, a point that foresters must be cognizant of when promoting the managed forest. When other values take precedent there need not always be a total cessation of timber productivity but rather only a modification of it. Timber in this sense can be a by-product of outdoor recreation, wildlife production or aesthetics.

*Forest Land Taxation -- Forest land assessments, statewide, have increased proportionately more than other classes of land in the last decade largely because timber production is now in competition with other land uses, like recreation and residential development, and because forest land assessments in past years were extremely low. The result of these increases are advalorum taxes so high as to destroy landowner incentives to raise a timber crop. Opportunities to alleviate property tax concerns relate to: 1) a change in the assessment procedure that would levy an annual tax only on the value of the land and on the annual timber growth on the land rather than on the full value of the timber each year; 2) greater participation in Wisconsin's forest tax laws; 3) revisions in the forest tax laws that would provide a better focus on timber production, eliminate landowner concerns over public access and result in a more permanent commitment to the production of the products of the forest than contained in current laws.

*Cost-sharing Incentives -- There are several ways in which more PNIF owners can be encouraged to commit their land to long term forest management. In addition to the creation of previously mentioned more favorable advalorem taxes there are opportunities for the creation of a government sponsored timber crop insurance program similar to the program for agricultural crops, for commodity price supports, for an increase in annual funding for the FIP and ACP beyond the $560,000 now provided by the combined programs, and for an increase in the value of timber stumpage and, accordingly, timber sale revenues. Consideration may also be given to expanding current financial assistance programs to include cost-sharing for consultant services when such services are related to the sale of timber (including legal services), sale establishment and marketing.

*Information and Education -- Opportunities for I&E can be directed at providing landowners a better working knowledge of forest resource management, including timber and wildlife production, establishing better marketing conditions for standing and cut timber, and at acquainting landowners to the various sources of technical assistance. There is also an opportunity to make the landowner more self reliant in making land management decisions through training programs and informational literature.

*General Management - There is considerable opportunity to improve public access to PNIF ownerships, especially for dispersed recreational activities, including hunting and fishing. To fulfill this opportunity consideration can be given to the provision of public access incentive payments, the establishment of private hunting and fishing preserves, an acceleration of programs like Project Respect, and to increased participation in the current Forest Crop Law which guarantees public access for hunting and fishing.

Timber productivity can be enhanced by focusing attention on its value to other forest uses. Although the production level may be less than optimal, the PNIF owner gains by fulfilling his/her principal management interest; be it wildlife production, outdoor recreation or aesthetics.

*Pricing and Profits -- New capital formation opportunities in addition to capital gains retention provisions would benefit the PNIF owner. These might include tax credits for productivity oriented forest management measures, amortization of costs, or the removal of minimum tax provisions. There is also an opportunity to modify estate, undisturbed profits, and inheritance taxation procedures to encourage the growing of timber and to discourage the breaking up of forests by heirs to meet tax obligations. The provision of low cost government guaranteed loans for forestry measures and price guarantees would also aid the PNIF owner.

The growing of timber by the small landowner needs to have a greater profit motivation than currently provided. Numerous ways to defray land retention and management costs prior to harvest have been suggested in the preceding discussions. Some of these are operational, some of those now operational need more favorable changes, and some are only for consideration by governmental bodies.

11490

Subprogram: Forest Resource Protection

Introduction

This program for the protection of Wisconsin's forests is directed at forest fire and insect and disease control activities, two of the categories of causal factors that destroy an estimated 118 mm cubic of growing stock timber annually (Table ____)[1]. Although they do not represent the major cause of mortality, they do represent those causes that can be, in part, controlled by the actions of people. The third, and broadly stated as "other" in Table____, cause of mortality generally results from other natural phenomena over which people have little or no control. Wind and ice storms are good illustrations of these. Unmeasured, but considerable losses also occur in trees in the seedling and sapling size classes. It is estimated that if these were measured, the total loss would triple in size. Like most forest related occurrences, mortality losses must be measured as averages. They tend to be cyclic, rising and falling in importance perhaps by chance but most often because of other natural forces; like weather, population dynamics and predation variables; that affect the incidence of their occurrence. No single year of recorded mortality losses can be counted on to be representative of losses in any other year. Programs designed to cope with mortality must be flexible in their adaptation, prepared to meet unusually threatening situations and fully integrated with other forestry programs. Other programs, like outdoor recreation and wildlife can be as much, if not more, affected by mortality losses as is timber production.

The reduction of risks to the forest resource is of considerable importance to management investment decisions. The past thirty years have witnessed an upswing in timber management, recreation and wildlife investments and predictions are that future years will witness even greater investments (see Timber Resource Program as illustration). An effective resource protection program has made these investments feasible.

Forest Fires

There is a general consensus that timber losses due to forest fires are small in relation to the other reasons for mortality (Table ____). Yet in the absence of adequate protection, forest fires could create risks which would seriously threaten management investments. The years 1976 and 1977, for example, were not typical fire years in terms of fire losses yet they serve to dramatize the ever present potential of fire to destroy large acreages of forests.[2]

Three public issues related to fire management were evaluated during the course of plan development (Appendix A). They dealt with the expansion of DNR organized fire management activities beyond the current boundary, arsonist and railroad caused fires, and structures in fire prone areas. This program will address these and other issues related to Wisconsin's forest fire management activities.

[1] Forest Statistics of the U.S., 1977 estimated annual mortality losses at about 70 mm cubic feet.

[2] Wisconsin's Forests, An Assessment 1980; DNR.

TABLE _____. Estimated Mortality to Growing Stock by Cause (1956 and 1968)

Cause	1956		1968		Average Volume Loss (mm cu. ft.)
	Percent	Volume Loss (mm cu. ft.)	Percent	Volume Loss (mm cu. ft.)	
Fire	.18	.32	.22	.13	.23
Insects	4.03	7.09	1.59	.95	4.02
Disease	30.56	53.80	51.95	31.12	42.46
Other[1]	65.23	114.83	46.24	27.70	71.27
Total	100.00	176.04	100.00	59.91	117.98

[1] Includes weather factors, animal and logging damage, and drought.

Source: The 1956 and 1968 statewide forest inventories.

TABLE _____. Fire Causes Within the State's Organized Protection Boundary (1974 through 1980)

(in number of fires).

Cause	1974	1975	1976	1977	1978	1979	1980	Total	Ave. %
Lightning	39	32	72	59	15	15	40	272	1.83
Campfire	47	69	172	62	46	40	61	497	3.33
Smoking	229	220	431	154	89	69	180	1,372	9.21
Debris burning	441	413	505	367	262	257	565	2,810	18.86
Incendiary	301	239	535	271	117	79	309	1,851	12.42
Equip. Use	186	197	468	182	175	106	277	1,591	10.68
Railroads	736	479	1,144	425	296	378	339	3,797	25.48
Children	175	144	288	157	91	126	192	1,173	7.87
Misc.	209	157	526	184	138	94	232	1,540	10.33
Total	2,363	1,950	4,141	1,861	1,229	1,164	2,195	14,903	--

Although DNR has primary responsibility for forest related fire management activities, the program is not exclusively for that agency.

Causes of Forest Fires

The actions of people are responsible for 98 percent of all forest fires in Wisconsin. The remaining 2 percent are of lightning origin. Railroads and debris burning are the two leading causes of fires followed by arson, motorized equipment and careless smoking. Arson, or incendiary, caused fires are normally the most destructive. There were an average of 2,100 fires and 17,000 acres burned each year from 1974 through 1980 time period in that part of the state under DNR organized protection.[1] Table _____ provides an annual summary of the causes of these fires. Of the acres burned, an estimated 62 percent were commercial forest land.

Goal

It is the statewide goal of DNR to limit the acreage burned annually to no more than one-tenth of one percent of all the acreage protected. This goal has been met in most years since 1950.

Attainment of the goal is dependent on several factors including the success of prevention, pre-suppression, and detection activities and the ability of DNR fire management personnel to meet such suppression targets as:

- there should be no more than 125 fires per year per one million acres protected,
- no more than 20 percent of the fires should exceed 10 acres in size, and
- all fires will be controlled within the burning day they were detected or before 10:00 A.M. the day following.

Problems

The following is a list of briefly stated problems opposing fire management activities in the attainment of the statewide goal and targets.

1. Railroad fires -- problems are associated with a failure to properly maintain railroad rights-of-way, faulty train equipment, and an inability to strictly enforce fire laws.
2. Debris burning -- problem is largely related to the increasing numbers of permanent and seasonal residences in rural areas.
3. Arson fires -- these are often set in locations difficult for suppression efforts to reach and, on days when burning conditions are best. The intentional, criminally inspired aspects of arson makes it additionally difficult to deal with.

[1] Cause and acreage data for that portion of the state under cooperation protection are not complete.

4. Structures in fire prone areas -- problems relate to debris burning, diversion of fire control efforts from land to structures, improper maintenance of grounds surrounding structures, a lack of zoning or zoning enforcement for structure development, and a general public unconcern for the risks involved in rural structure development in fire prone areas.

5. Peat fires -- problems are associated with the lack of early detection and suppression, length of time involved in extinguishing the fire, and social and health interests of the affected public. Also, many of the peat fires occur outside of organized protection where trained personnel and proper suppression equipment are in short supply.

6. Forest use pressure -- the increasing numbers of people using forests for recreation and other purposes increases the risk of fire.

7. Wilderness areas -- inaccessability, fuel buildup and generally unregulated public use combine to create high risk and difficult suppression problems. No formal policy or guidelines for fire prevention and suppression are in operation for these areas.

8. Fuel buildup -- conifer acreage increases, wilderness dedications, and fire protection in itself contribute to the volume of potentially dangerous fuels in the forests.

9. Incomplete fire data -- inadequate or improper reporting of fire causes and damages in the part of the state under cooperative protection impedes the creation of a uniform and fully effective statewide fire management program. There is also a statewide dearth of information on timber losses by fire.

Insects and Disease

Wisconsin's most recent statewide forest surveys suggest that approximately 40 percent of the state's growing stock timber mortality is caused by insects and disease (4 percent insects - 36 percent disease). Of the estimated 118 mm cubic feet of timber lost to all causes annually, 4.7 mm are estimated to be insect caused and 42.5 mm are disease caused. In many cases the reason for the loss, insect or disease, is difficult to clearly determine because of the close relationship the two causes have with each other. One objective of the Timber Resource Program is to reduce mortaility losses by 50 percent by year 2010 using base year 1977 and its 70 mm cubic feet loss estimate as a starting point.

There are no studies to establish the extent of loss to seedlings and saplings by insects and disease but it is thought to be considerable. The affects of losses in these size classes are generally most significant from a biomass production perspective but less critical from the pole and sawlog view (conifer seedling and sapling size plantations are an exception). This is because a certain amount of mortality, usually in diseased or weakened trees, is a natural and necessary phenomena in stand development.

Tree Nursery Losses

Proposals to expand the production of Wisconsin tree nurseries (Subprogram: Forest Tree Nurseries) are expected to increase the potential for nursery pest infestations. Damping off fungi and root rots are the most common and destructive pest problems in nurseries. They can be controlled, however, so as not to present a serious threat to increased nursery productivity.

Integrated Pest Management (IPM)

IPM is defined as: growing a crop while managing its several pests in as cost effective and environmentally safe manner as possible -- the crop referred to here is timber.

The major emphasis is to control insect and disease damages by one or a combination of four broad control alternatives. These are:

1. Direct controls -- these are the most controversial but not the most common of IPM measures. They are typified by the use of insecticides and fungicides and are generally used only when epidemic conditions are present or eminent.

2. Indirect Controls -- these are typically silvicultural applications for the purpose of manipulating forest composition, increasing tree vigor and ridding the forest of trees or conditions that might lead to excessive insect and disease damages.

3. Biological controls -- these are ever present in nature but not always in proportions adequate to confront insect and disease epidemics. When imbalance occurs, it may be more practical to introduce biological mechanisms for control than to engage in direct control alternatives. Biological control mechanisms are found in the form of predators, viruses and bacteria. They are effective when long term controls are desired but are most often too slow in their response to epidemic situations.

4. Other controls -- these are brought about by such management induced actions as cutting at correct rotation age, reductions in logging damage, and more complete timber salvage. The objectives of these measures are to keep the forests in a vigorous growing condition and to maintain sanitary conditions under which insect and disease potentials are minimized.

The IPM program allows for the application of these types of controls in an integrated manner so as to reduce protection costs and pest damages while at the same time providing for the many values generated by the forests in a reasonably undisturbed manner. IPM needs to be an integral part of all forest resource planning and to have access to all control tools to be fully effective. It must also have the benefits of research and study to keep tools of control up-to-date and to be able to predict when pest damages are going to occur.

Insect and Disease Concerns

The following are a few of the most prevalent insect and disease concerns as they relate to forest management actions:

- Softwood Reforestation. This activity can be jeopardized by such pests as root collar weevil, Zimmerman pine shoot moth and shoestring rot when not properly planned and conducted. Large, unbroken blocks of trees of the same species and similar age class are most susceptible to pest attacks.

- Biomass Plantings. The limited acreage devoted to biomass production in Wisconsin has not made them of serious concern to date. However, the susceptibility of hybrid poplar and cottonwood to rusts, borers and leaf beetles could cause survival problems in the future if biomass plantings become more prevalent.

- Hardwood Intermediate Cuts. Proposals to increase timber stand improvement activities and pulpwood and firewood harvesting in young hardwood stands presents greater risks of mechanical damage to residual trees and, following, insect and disease infestations.

- Tree Nurseries. Root rot and damping off fungi present the greatest risks to increased nursery production, particularly if the nursery beds are planted too densely. Proposals to expand nursery production to accommodate the highest productivity alternative (see Timber Resource Program) cannot likely be satisfied by space in the three state owned nurseries without incurring more than an acceptable level of risk.

Forest Resource Protection Opportunities Insect and Disease Related

Opportunities for increasing timber production and enhancing the forests of the state for their other values by protection against insect and disease losses are contained in the following:

1. A better understanding of integrated pest management (IPM) by field foresters has the potential to lessen most of the concerns related to insect and disease losses. IPM guidelines will need to be written and a better means of predicting insect and disease buildups will need to be developed, possibly by a sample plot monitoring system for threatened timber types having a high priority for protection.

2. The production of insect and disease resistant varieties of tree planting stock is essential to the reduction of insect and disease losses in future coniferous plantations. Seed orchards planted to trees having superior genetic characteristics have been established by the DNR but will not produce viable seed in reasonable quantities for nearly 20 years. There are approximately 68 acres in seed orchards in the state. The integration of superior tree seeds to the statewide planting program will be a slow transition.

3. The use of chemicals in the control of forest insects and disease is a necessary and acceptable part of IPM as long as the chemicals used and application techniques are in accord with state and federal regulations. Attainment of the objective of reducing timber mortality by 50 percent by year 2030 will not be possible in the absence of a comprehensive program for the use of chemicals (pesticides).

4. A program for IPM has best application at the individual property level and can be most effective when made a part of the comprehensive long range plan for the individual property. Statewide guidelines for the inclusion of IPM in property plans are needed to assure reasonable continuity among projects and accomplishments.

5. The current (1982) budget for insect and disease management activities totals $306,400 of which $58,100 represents the federal share. No special project funds, as for Dutch elm disease and spruce budworm, were contained in the 1982 budget appropriation. Accelerated insect and disease projects, such as for the statewide cause and extent survey and the forester orientation to insect and disease problems, should be completed by year 1987 at a cost of about $100,000 yearly in excess of the 1982 budget.

6. The major thrust of future I&D programs is expected to be in the protection of the conifer resource and, mostly, the high investment pine plantations which are expected to increase in number and acreage in the future.

Forest Fire Related

Opportunities for increasing timber production and enhancing the forests of the state for their other values by providing protection against fire losses are contained in the following:

1. An increase in DNR and local fire management activities in fire prone areas of the state can serve to protect both the valuable conifer forest and the homes and other structures that occupy such areas. Management must be directed at reducing fire starts, initiating fire planning among all ownerships, early detection, and rapid suppression.

   The use of helicopters in early suppression activities in fire prone areas appears highly feasible. Helicopters can be purchased or leased or can be contracted for seasonally or during those times when the risk of fire is high enough to warrant their use. DNR fire management studies support the provision of helicopter services in DNR's North Central and Northwest administrative districts. An annual appropriation of $100,000 has been made for helicopter fire suppression service by DNR. Concerns related to helicopter use include:

   - High costs -- estimates put standby (on the ground) costs at $1,200 per day. An additional cost of $800 per hour is applied when the machine is in flight. Proposals for purchase or long term lease are not now being considered by DNR.

- Operations -- in order to be fully effective, use has to be directed by a very experienced operator (pilot).

- Effectiveness -- use is only recommended on small fires or those exhibiting static fire conditions.

- Reliability -- helicopters are subject to mechanical breakdown and intensive maintenance and, therefore, may not provide reliable service. Also, because the type of helicopters needed are few in number, and in considerable demand, they may not be available when needed most.

2. Structures in fire prone areas pose special problems for fire management personnel. They often are the source of fires caused by careless debris burning, seldom have been exposed to precautionary measures to protect the property from advancing fire and often divert forest fire fighting equipment and manpower from their primary function of protecting the forest. Opportunities to correct these problems are already underway in some parts of the state in the form of zoning against further developments and for the purpose of forcing the existing property owners to take required protective measures. Zoning of this kind, and attendant enforcement, would be of substantial benefit to forest protection efforts in all parts of the state.

3. Railroads have traditionally been a major cause of forest fires but their numbers and importance have been declining due to stepped up efforts to maintain trains in good working order and to maintain railroad rights-of-way in a fuel free condition. There are no opportunities in addition to those already being carried out to reduce railroad damages except as they might apply to an acceleration of the current program.

4. The incidence of fires of incendiary origin has not increased during the past seven years (Table _____) yet they continue to be a major concern of fire management personnel for reasons cited earlier. Opportunities for reducing the number and affects of forest fires are related to strong enforcement of arson laws, information and education programs, and early detection and suppression. The difficulty of addressing a premeditated criminal act on a resource as extensive as the state's forest precludes many presuppression activities.

5. The emphasis of DNR forest fire management activities is directed at those parts of the state having the most extensive forest resource, where forest related wild fires are greatest in number and where forest fuel conditions pose the greatest threat to natural and manmade resources (fire prone areas). To address this emphasis in the absence of adequate overall program funding, it may be necessary to reorganize the program by reducing, or eliminating, protection activities in some parts of the state under cooperative protection leaving program responsibility there to local rural fire fighting authorities. A redirection of program gains importance when anticipated increases in softwood fiber production and overall public use of the forests are taken into account.

6. The importance of fire management to Wisconsin's forests cannot be measured by the minor affects it is reported to have on total wood fiber production in years 1956 and 1968 (Table _____). If these losses are representative of all years, then achievements would have to be measured against the inroads made into reducing the annual loss estimate. Here, even a substantial 50 percent reduction would be weak justification for program change. The point here is that fire management is now doing a good job in protecting the forests but must remain flexible to address new protection needs as they arise.

11280

Subprogram: Tree Nursery Production

Introduction

Tree planting is an important cultural activity that must be conducted to perpetuate the statewide forest resource and expand its ability to produce selected timber products. The shortage of pine fiber described in the softwood fiber issue (Appendix A) is an outstanding example of tree planting's importance to Wisconsin's forest productivity. Tree planting for commercial timber production involves either the establishment of trees on an area not previously forested or the enhancement of an existing stand of trees to improve its productivity and often its value.

The following discussion relates to Wisconsin's public and private tree nursery programs from which most of the planting stock for conversion and reforestation is obtained. It presents current nursery activities and suggests how future demands for planting stock (as set forth in the Timber Resource Program) can be met. Wisconsin's Forests - An Assessment, 1980 contains additional information on tree nurseries including their ownership and history.

The Program

The success of the accelerated reforestation and conversion program will be dependent upon the availability of planting stock and, it is assumed that state nurseries will supply most of the trees required. Several forest industries with active planting programs will continue to raise a part of their total planting stock needs now at 5-6 million trees annually. The two national forests which are supplied by the U.S. Forest Service operated Toumey Nursery in upper Michigan may not continue to obtain stock from that source. There has been discussion relative to the state nurseries eventually supplying the needs of the Nicolet and Chequamegon National Forests. County forests, private landowners and state agencies will continue to rely on state-owned nurseries to satisfy a majority of their planting stock requirements.

At present, the Wisconsin DNR operates three tree and shrub nurseries. These nurseries produced over 16 million trees in 1981. Plans are to increase total production to 22 million by 1985. The adoption of any of the three alternative accelerated programs would require, at a minimum, nearly doubling that part of current nursery production assigned to commercial forest plantings.

Approximately 11 million of the 16 million trees grown in state nurseries are actually used for commercial forest establishment including replanting. The remaining 5 million are for educational and extension purposes, scattered wildlife plantings, windbreaks, shelterbelts or small parcels that do not materially contribute to the state's wood supply. None of the production can be used for ornamental purposes. About 4 percent of the state's nursery production is of hardwood species; predominately maple, oak and walnut. State nurseries are required to sell trees at cost. Prices for trees to be planted in 1982 ranged from $36.00/M for bulk ordered seedlings to $126.00/M for bulk ordered transplants. Counted orders are about twice as costly as bulk orders.

Table A shows current nursery stock production by agency or owner and the projected needs (inc. current) under the three levels of management intensity. It is obvious that the responsibility to produce the greatest share of planting stock will fall to the state nurseries. This is due to the fact that 96 percent of the recommended reforestation and conversion will be done on private non-industrial, state and county lands.

TABLE A

Current and Projected Nursery Production in Wisconsin
(Commercial Forest Est. or Conversion)

Producer	Current (1981) Production	Anticipated Production Under Three Levels of Mgt. Intensity[1]		
		Low	Standard	High
	(No. of trees)	No. of Trees		
Federal[2]	1,500,000	-	-	-
State	11,000,000	26,400,000 (15,400,000)[3]	34,050,000 (23,050,000)[3]	41,750,000 (30,750,000)[3]
Industry	2,500,000	3,100,000 (600,000)[3]	3,450,000 (950,000)[3]	3,750,000 (1,250,000)[3]
Total	15,000,000	29,500,000 (16,000,000)[3]	37,500,000 (24,000,000)[3]	45,500,000 (32,000,000)[3]

1 Annually from 1985 to the year 2030; assume 800 trees per acre.
2 Assumes nursery production will terminate by 1985.
3 Additions to current production.

The present three state nurseries; at Hayward, Boscobel and Wisconsin Rapids; have the capability to increase production to 40 million trees (includes noncommercial planting stock) and could nearly accommodate the high level demands within three to four years (by 1985). It is doubtful if any more than 35 million additional trees for commercial forest planting could be raised in state nurseries without creating additional beds, establishing another tree nursery or investing in green houses for the growing of tublings. Tublings have not received a great amount of attention due to the high investment required and the doubtful success of the small tublings, particularly on difficult planting chances. A small, but undetermined, part of the commercial forest planting program will be accommodated by privately owned (non-industry) nurseries which produce excellent planting stock.

Opportunities for increasing planting stock for the accelerated program will be principally in red and jack pine seedlings. This would not, however, preclude the planting of other species or even exotics such as hybrid larch should they prove successful in growth and pest resistance.

Any nursery program should involve tree improvement to obtain superior trees from superior seed sources. The state DNR has 68 acres in seed orchards (mostly red pine) and has set aside or committed an additional 500 acres of state land on which to raise superior quality seed. The present acreage of seed orchards (none are now producing seed) is not nearly great enough to

satisfy existing or accelerated timber production programs. Seed collected from existing orchards will, in turn, be used to establish new orchards. The DNR tree improvement program in cooperation with the University of Wisconsin and the U.S. Forest Service has set a seed orchard goal of 1000 acres. With the use of superior planting stock in future plantation establishment, greater timber yields than those anticipated with the accelerated programs are possible.

The opportunity for raising fast-growing stock for biomass has not been seriously considered by landowners at this time although hybrid aspen and hybrid poplar show promise for pulping purposes. Over 26,000 hybrid aspen were distributed in 1981 and planted on private, county and state forests. 1982 distribution is expected to be 40,000. Consideration may also be given in the future to providing hardwood stock for energy wood biomass plantations.

In conclusion, an accelerated reforestation and conversion program, depending upon its intensity, will require more than doubling current nursery production, possibly an expansion of existing nurseries and a stepped up tree improvement program.

1000M

Subprogram: Forest Resource Survey

Introduction:

An up-to-date forest resource data base is essential to Wisconsin for several reasons. It serves as an instrument for expansion and procurement planning for forest industries, guides forest land management plans and assists in making public short and long range budget and policy decisions. Forest resources are dynamic and therefore, subject to constant change; a condition that requires data base updating at intervals no greater than ten years. The older the resource data becomes the more unreliable it becomes.

Forest survey techniques may vary among sequential surveys, as are conducted in Wisconsin, but the data collected must always have accuracy and consistency to be fully useful. The U.S. Forest Service, the agency largely responsible for forest surveys in this state, has achieved both of these objectives not only among Wisconsin surveys but also among similar surveys for all states in the nation. Coordinated, long range forest resource planning programs underway for the states of Minnesota, Michigan and Wisconsin are, for example, dependent on consistent, accurate and up-to-date data sources.

Past Forest Resource Surveys in Wisconsin

The initial attempt at assessing the state's forest resources appeared in 1931 in the Copeland Report. This study was based on general type maps and a rough field reconnaissance. It could not be classed as a survey by modern survey definitions.

The first official survey, conducted from 1935 to 1937, consisted of a line and plot cruise of the entire state to determine the area of commercial forest by type and timber volumes by species and quality. It provided no information on annual growth, mortality or removals. This first true survey of the forest resource was accomplished by establishing sample plots at one eighth mile intervals on north-south lines drawn at ten mile intervals the length of the state.

The second survey began in 1956, ended in 1958 and was published in 1961. It was a closely coordinated study involving the U.S. Forest Service, the state, counties and forest industries. This survey was considerably more detailed and accurate than any previous one not only in area and volume information but also because it included data on growth and roundwood product outputs, mortality, and removals. Added features of the survey were its year 1986 growth and removal projections. It was also the first Wisconsin forest survey to make intensive use of aerial photography.

A third survey, similar to the second, was begun in 1968 and published in 1972. The most important contribution of the 1968 survey was the updated 1956 information it provided. It also extended earlier growth and removal projections to year 1998.

The most recent forest resource data sources are computer updates of the 1968 survey. These were prepared by the USDA Forest Service to satisfy data needs for nationwide forestry planning as required by the Forest and Range Renewable Resources Planning Act of 1974 (RPA) and its 1976 amendment, the National

Forest Management Act. The results of the first update are contained in the comprehensive Forest Statistics of the U.S., 1977. The second update titled the Forest Resources Evaluation Program (FREP), occurred in 1979. The 1979 update was for the purpose of providing more accurate data for the 1980 RPA planning effort but it was never published in final form. Most of the data used in this (Wisconsin's) forest resource planning program was derived from the 1977 update.

Current Forest Resource Surveys for Wisconsin

Wisconsin, in cooperation with the U.S. Forest Service, is now conducting a field survey of the state's forest resources. The survey began during the summer of 1981 and is scheduled to be concluded in 1983. A published version of the survey is not expected before 1985. Although it will be largely an update of the 1968 survey, it will be more comprehensive. The 1981-1983 survey will have the same statistical accuracy as the 1968 survey but will contain more detailed information on area, volume, growth, removals and mortality. Data on treatment needs, biomass and landowner attitude will be included in a Wisconsin survey for the first time. Survey findings will be used in Wisconsin's next generation forestry plan in 1985.

While statewide forest resource surveys are useful in providing general information for use in the development of Wisconsin's forestry program it does not contain the detail needed for on the ground management decisions. Two types of surveys are now in use in Wisconsin by major forest landowners to satisfy this need. They are "Continuous Forest Inventory" (CFI) and "Forest Reconnaissance" (FR).

The CFI survey system is now used on forests managed by forest industries and the Department of Interior, Bureau of Indian Affairs. It provides accurate area, volume, growth and removal data within time periods no greater than 10 years. Permanent sample plots are established mechanically and measurements conducted within each of the plots is done with considerable accuracy. A major drawback of the system is that it doesn't describe where timber types are located. CFI is not only a useful tool in making management decisions but has also been used by industry for making corporate tax analyses.

The type of survey conducted on national, state and county owned forests is forest reconnaissance. It provides good data on area, timber types, harvest dates and treatment needs but it does not provide information on growth, mortality and removals. Forest reconnaissance also provides general information related to recreation and wildlife potentials and timber access. This computerized system is an excellent tool for the individual property manager to use in project work planning but does not provide all of the information needed for statewide, long-range planning.

1981-1983 Survey Procedures and Responsibilities

*General Procedures

Aerial photography interpretation is the initial step in the survey procedure to segregate forest land from other forms of land cover and to classify the forest cover as to timber type, stand size, and density. Photography permits the random selection of plots among type, size and

density criteria and identifies the number and location of plots to be taken. The system of plot selection is termed the "ten point cluster system."

Actual field examinations follow to ground truth the accuracy of photography interpretations and to take selected plot measurements. Measurements include determinations of biomass, stand size and density. Volume information on biomass, poletimber, and sawtimber can also be extracted from the data collected as well as information related to growth, removals and mortality. Another feature of the field examination is the information obtained about the landowner's property tenure; a kind of information that will be helpful in determining what forest management programs and opportunities are best suited to the private non-industrial forest landowner.

Concurrent with the survey of the forest resource is a canvas of the state's primary wood-using industries. This study is for the purpose of determining how much Wisconsin grown wood is being utilized by Wisconsin's primary industries and the form in which it is being acquired. Wood fiber purchases include sawlogs, pulpwood, firewood, chips and piece products like posts and poles. The Forest Service is conducting the pulpwood drain and Wisconsin's DNR is responsibile for the drain to all other products.

*Responsibilities

The responsibility for periodic nationwide forest surveys was provided U.S. Forest Service Experiment Stations by the 1928 McSweeney-McNary Forest Research Act. In the current Wisconsin survey, the North Central Forest Experiment Station provides the survey methods, tabulates and analyzes field data, and publishes the final report.

In cooperation with the Forest Service, the Wisconsin DNR forestry staff performs aerial photography interpretations and conducts the actual field survey. Financial support for a number of associated functions, including administration, is also provided by DNR.

Survey Accuracy

Statewide forest inventories and, accordingly, their nationwide summaries are statistically accurate at the time the survey is take but lose accuracy with the passage of time. The level of accuracy for various elements within a survey, like growth and mortality, may vary somewhat but never to an unacceptable extent. Statewide surveys, whether of field or computer origin, should be performed at intervals no greater than 10 years.

Surveys should not be expected to provide data in any form that was not originally programmed for the survey. The extraction of county data from statewide forest data, for example, has been found to result in considerable inaccuracies in Wisconsin largely because the individual county samples were too few to be statistically representative of county conditions. Accurate county data would be extremely costly to obtain and, thus far, would not have provided enough information diversity to justify the added expense.

Survey Opportunities

New or Improved Data

The following is a list of data deficiencies that could be corrected by an expansion of current forest resource survey. The list is not intended to describe priorities, may not be complete, and does not take into account provisions of the ongoing 1981-1983 statewide survey or any other studies now in progress. There needs to be additional information on:

a) timber harvest opportunities as they relate to type, ownership, volume and acreage.
b) tree planting and cultural opportunities.
c) imports and exports of lumber.
d) the acreage and timber production potentials of all publicly owned forests (especially county-owned).
e) the use of residue, including bark.
f) annual growth by species and ownership.
g) removals by species and ownership.
h) size class, timber type and site class by ownership.
i) landowner attitude toward various forest uses.
j) wood fiber drain, including wood for energy.
k) biomass in terms of volume (tonage) and species.
l) allowable cut and operability.
m) imports of wood pulp and residues.
n) the other uses or values of the forest, including recreation, wildlife and water.

Data Maintenance

The ability of field surveys to provide continuing, up-to-date, statewide forest resource data has not been well demonstrated in Wisconsin largely due to the high cost of conducting them at the frequency needed and the considerable manpower commitments necessary to carry them out. In the future, the state and federal government can look to more frequent data changes through computerized updating programs. Both the 1977 and 1979 U.S. Forest Service nationwide forest resource updates were of computer origin and were statistically accurate with most of their products. Wisconsin will need to depend on these kinds of analytical capabilities if forest resource plans are to be updated at five year intervals. Computerized surveys will not, however, negate the need for field surveys. The frequency of field surveys which will be largely determined by the level of sophistication of computer programs.

County Data

Traditionally, the cost of gathering and processing resource survey data for geographic units less than the size of the state has been prohibitive. However, with computer potentials it may be justifiable to bear the additional initial expense of collecting statistically sound county data on the premise that its use expectancy can be projected beyond the normal time interval of field surveys. Costs, therefore, would be spread over a greater time period and be more justifiable.

Accurate county data would be useful to countywide land use planning and would help assure that forestry is properly represented as a legitimate land use. It would also allow for forestry planning among groups of counties. Examples of multi-county planning opportunities include regional planning commissions, DNR areas and districts, Resource Conservation and Development areas, and Coastal Zone areas.

Data Coordination

There is a current trend to eradicate state boundaries for planning and for certain kinds of timber resource analyses. The States of Michigan, Minnesota and Wisconsin have, for example, attempted to combine parts of their forestry planning program, including data on timber supply and demand, to address issues of mutual concern and having no well defined relationship to state boundaries. Coordinated planning of this type carries with it requirements for survey timing and common data and analyses language. A primary purpose of the multi-state approach is to eliminate, or reduce, conflicts among agency and industry decisions related to timber production, utilization, and transport.

Data Analyses

Data, as collected and summarized, does not always provide the information planners and decision makers are seeking. It does, however, provide the essential ingredients for many desired resource analyses. The Timber Resource Program, for example, contains a number of analyses of supply and demand that could easily be satisfied by a computerized program. Such programs may serve to guide data collection methods and must be considered as much a part of forest survey as the field survey and its subsequent summary. Computer program opportunities, at the onset, should address statewide and multi-state information needs and be closely aligned with needs for economic analyses. Agencies having the best potential for computer program development are the DNR, University of Wisconsin and the North Central Forest Experiment Station.

1031M

Information and Education Program

All of the twenty-three issues confronted in this study depend to some extent on public information and education (I&E) programs for their resolution. The focus of I&E progrms on forestry matters, with the possible exception of fire management, has been woefully less than adequate in the past. Evidence of this is found in discussions leading to the setting of rationale for land use changes, in the public's negative reaction to certain forest management practices, and in the lack of interest in forestry shown by a large number of private non-industrial woodland owners.

A program for the acceleration of forestry's I&E efforts can be started with a minimum of delay. To be successful, however, it must be well coordinated among all educational and forestry interests choosing to participate. Execution of coordination needs to be vested in one agency, like U of W - Extension Forestry, but the actual involvement in implementing such a program will be largely the responsibility of other groups like the U. S. Forest Service, DNR, forest industries and the Wisconsin Woodland Owners Association groups that have the manpower capability to carry out a meaningful statewide program. The program can utilize all the informational media available in the state but should concentrate efforts in urban areas where forestry programs are most often misunderstood.

The following is a list of measures for an improved I&E program as gleaned from the twenty-three issues.

1. Develop an I&E program that would express the benefits of the managed forest to such an extent that financial aids for on the ground practices could be reduced or phased out while recognizing that economics of profitable forest have much to do with the need for these financial aids.

2. Reinstitute the "How To" series of brochures for forestry activities.

3. Develop and disseminate better marketing data to the small woodland owner.

4. Increase the role of the Wisconsin Woodland Owners Association in providing timber sale advice to the private non-industrial owner.

5. Develop a better means of communicating with industries to determine their short and long-range timber needs.

6. Put into effect a total I&E program that emphasizes the correct application of forest practices, including herbicide and pesticide use, and the many other benefits of the managed forest (wildlife, recreation, etc.)

7. Emphasize the use of demonstration areas near urban areas to illustrate the advantages of proper management and arrive at an effective way of utilizing their educational values.

8. Institute a statewide I&E program by engaging the services of professional information specialists. Progam funding would originate with all forestry interests in the state.

9. Divert more forestry staff time to I&E activities.

10. Educate the public of the need for acceleration in timber production and the impact of the acceleration on the other values they have identified with the forests.

11. Develop a coordinated I&E program among public agencies and the private sector under the leadership of the University of Wisconsin-Extension.

12. Develop a demonstration forestry program in urban areas to describe the environmental acceptiveness of the managed forest.

13. Intensify educational efforts among owners and occupants of rural residences in fire prone areas in proper premises maintenance, debris burning, road layout, and fires suppression techniques.

14. Expand the use of demonstration forests as a means to promote good forest land management.

An examination of the recommendations reveals a need for a well coordinated I&E program among all forestry interests with the leadership for such a program in the hands of an agency having professional I&E talents. The program must be directed at the vast public who make political decisions regarding the management of the forests and who own nearly 60 percent of all the commercial forest land in the state. It should be for the purpose of gaining greater timber productivity through management, a better understanding of the need for forests in our society, and a better informed public on all mattes relating to forest use and management. If these purposes are achieved, issues related to public awareness, single purpose management and restrictions on forestry practices will be largely resolved.

The Program

An I&E program for the future is expressed in general terms in Plate _____, a matrix illutration of which public and private agencies assume a high level responsibility for various I&E functions. Those responsibilities are described by I&E major interest groups as follows:

* U. S. Forest Service
  This agency has carried on a rather successful I&E program in the past as it applied to fire control (Smokey Bear) and land management (Woodsy Owl). It has also been a strong advocate of public participation programs in all areas of its interest and has availed its training programs to other public and private forestry groups on a continuing basis. The support it has given to urban forestry progrms and the Wisconsin Woodland Owners Association is typical of its high level I&E activity.

  Recommendations for future Forest Service involvement with I&E beyond the current level are few and include additional funding support for state activities like "How To" brochures, RFA acceleration in the PNIF sector, and assistance to the U of W Extension Service through the Department of Natural Resources. An additional emphasis can also be placed on the use of the National Forests to demonstate the benefits of forest management.

* Soil Conservation Service
This agency will continue to encourage good timber management on all forest lands and especially on those forests owned by its cooperators. Referrals for forest management assistance are directed to DNR foresters and private forestry consultants. The strong and effective relationships between SCS and the Soil and Water Conservation Districts is a means of encouraging additional forestry practices among private-nonindustrial ownerships.

* U of W - Extension Service
Extension can play the lead role in future statewide forestry I&E efforts by involving itself in all levels of I&E activity. To do so requires an increase in staffing of foresty-oriented I&E personnel, a redirection of current staff responsibilities to the traditional I&E functions, and better utilization of community faculty. The three major categories of programs are training of others in I&E techniques, publication of informational materials, and public contacts through media use. Financial assistance for the support of an accelerated program might best be achieved through a cooperative effort headed by a state general fund contribution, assistance aids from other state and federal agencies, and guaranteed contributions from the private sector. The latter contribution may be best used to fund that portion of the program concerned with the preparation and distribution of informational materials. Guidance for Extension's I&E program may come from an advisory committee, or council, composed of public and private forestry interests.

* Department of Natural Resources
DNR will continue to utilize its forestry and I&E staff for public information and education, relying to some extent upon training received from Extension and the Forest Service. The Department needs to make better use of its own I&E staff in forestry matters and to divert more forestry personnel time to this effort. I&E procedures to be followed should be uniform statewide and monitorable. Like the Forest Service, the DNR can make better use of state-owned lands to demonstrate the benefits of forest management. It should also help subsidize Extension's role in I&E.

* Department of Development
Enhancement of the state's economy will continue to be the major purpose of the DOD. The agency can champion the cause of the well managed and productive forest by its recognition of the value of the forest resource to Wisconsin's wood-using and forest based industries. The media offers the most expedient means by which the DOD can carry one an I&E program.

* Department of Public Instruction (DPI)
Wisconsin's elementary and secondary school systems offer excellent opportunities to reach the public with resource conservation programs. However, to mandate the scheduling of such programs in an already crowded school schedule without eliminating other subjects of importance may not be feasible. Nevertheless, conservation education should be permitted, credited subject in all school curriculums if it can be included without conflicting with other curriculum requirements. There is now widespread support for conservation education in the state's public schools.

The DPI's involvement in getting conservation education into public school curriculums is largely that of acquainting teachers with available teaching and training methods and materials. The most successful program to date is Project Learning Tree; a conservation education program sponsored by the American Forest Products Institute. Approximately 2,500 elementary (grades K through 6) and secondary (grades 7 through 12) school teachers have been exposed to this program to date. Further teacher exposure to conservation education has been achieved through Trees for Tomorrow, another forest industry sponsored program. Unlike Project Learning Tree, the offerings of Trees for Tomorrow are not exclusively tied to public education.

There now is no clear statutory authorization for requiring conservation education in Wisconsin's public schools. In lieu of this, the DPI has attempted to integrate it into other course work, particularly those courses in the Vocational Agriculture curriculum.

* Board of Vocational, Technical and Adult Education

The role of this state agency is not to increase forest productivity from the management perspective. Rather, it is to train people in the skills necessary to carry out the jobs prescribed by management. Woods workers possessing both the skills of their trade and the understanding of the "why" of their efforts can be a strong force in the public I&E program without being active participants. For example, many of the men who learned and implemented woods working skills in the Civilian Conservation Corps of the 1930's later became among the strongest supporters of timber management programs. It is expected that this agency will not play a measurable role in traditional I&E activities described for others in this program.

* Forest Industry

In Wisconsin, and nationwide, industry has supported forest managment programs, and especially, the multiple use concept. It has been most effective in media, personal contact and demonstration I&E activities. It is unlikely that industry will assume additional direct responsibility for other I&E activities but it may be counted on to lend financial support to the activities of others. The publication of training and teaching materials and the provision of forest land for demonstration purposes are activities in which such support would be most beneficial and likely to occur. Industry will need to increase its I&E efforts in the future.

* Private, Non-industry

The private, non-industrial forest ownership category can play an important role in I&E by the provision of demonstration forests, use of the media, and through personal contacts. Organizations like the 1,000 member Wisconsin Woodland Owners Association and the Soil and Water Conservation Districts have the greatest potential to promote forestry because they speak for, and to, groups of people having interests common to them. It is anticipated that these organizations will need additional financial and technical support in the conduct of their programs when such programs are extended beyond existing membership. The forestry interests represented by the private, non-industry sector are the most important of all to expose to I&E programs and they may well be most successfully influenced by their peers.

* Other
  This category refers to all other private interests desiring to promote good forest management. These may include school-sponsored organizations, conservation clubs, Chamber of Commerce groups, civic clubs, and individuals. Assistance to these interests will be provided through the distribution of informational materials and by industry and agency personnel instructions. There are no costs calculated for their I&E efforts.

Program Opportunities

Plate - describes the scope of current and proposed I&E promotions by public and private interest groups.

The largest portion of implementation is the responsibility of U of W Extension Service with the year 1985 projected funding requirements for continuing current and accelerated I&E programs amounting to about $600,000. The actual expenditure for forestry I&E implementation may well exceed this amount due to the contributions of others for special projects that are within the capability of University staff and students to perform. Forest industries, the U. S. Forest Service and the DNR will likely call upon Extension for involvement in such projects. It should be pointed out that cost and person power estimates for Extension in Plate -- cover its involvement only in projects having a direct relationshjip with forest management and timber production. Its other important activities concerned with watershed management, fish and wildlife, outdoor recreation, and environmental protection and pollution abatement are expected to be largely supported by funding sources other than forestry. Plate ___describes the scope of Extension's program.[1]

The Renewable Resource's Extension Act of 1978 (PL 95-306) defines Extension's role in forest and rangeland education activities and establishes the means by which federal assistance can be extended to accelerate its program. Assitance requested to nearly double the person years in the program has not been forthcoming.

Region 9 of the U. S. Forest Service has proposed to increase its person power emphasis on I&E programs by one-third by 1985 and increase its investment in related activities by about 20 percent (to $189,000). Most of the increased I&E emphasis from the State and Private Forestry Section of the Forest Service will be reflected in DNR programs. State and Private Forestry will, however, continue its commitment to the training of professional staff within DNR and to the distribution of informational materials related to forest resource management.

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[1]Wisconsin Forestry Extension Program Document, 1977. Dept. of Forestry - School of Natural Resources.

DNR's Bureau of Forestry can increase its I&E emphasis by about 25 percent, to 5 person years annually, by a redirection of the activities of existing RFA staff. The Bureau's current and future workload proposals support an increase of this proportion even though staff have not been able to commit their time to I&E in sufficient amounts. It is paradoxical that an emphasis in I&E activity may only add to an overall DNR workload that, under current conditions, cannot be met. Recent increases in numbers of DNR forestry personnel may serve to reduce a part of the unsatisfied workload despite their being largely assigned to public forest land management. Most of DNR's I&E effort will be directed at educational institutions and the news media. Foresty I&E activities within the DNR will be conducted almost entirely by the Bureau of Forestry and the Bureau of Information and Education.

The Department of Development (DOD) currently devotes one-half man year to forestry I&E programs annually and is not expected to increase this commitment by year 1985. As in the past, its program will be largely devoted to the promotion of the state's wood using industries and to the sustained yield management of the forest base from which the industry obtains its raw materials. DOD also will continue to serve as a repository for a considerable volume of statistical data related to industry's raw material consumption and products of manufacture.

Wisconsin's Department of Public Instruction (DPI) has no immediate plans to increase its environmental and vocational agriculture teaching commitments to the forest resource. Constraints to the program are contained within interpretations of state statutues, an absence of adequate funding, and the varying attitudes of local school districts toward teaching environmentally related subjects. DPI is currently intending to integrate environmental subjects with other subjects in the curriculum like math, science, and social studies; continue and expand the industry-sponsored Project Learning Tree; make better use of the state's school forests, and make environmental studies a requirement of vocational agriculture programs. DPI will continue to conduct seminars to train about 250 teachers annually in how to integrate Project Learning Tree into their ongoing teaching programs.

Wisconsin's forest industries carry on intensive, but not always coordinated, I&E programs. There is, therefore, no central source from which to obtain data on expenditures and current and projected person years devoted to I&E. Opportunities for continuing or enlarging industry's role in the I&E effort will be largely reflected in ongoing programs like Project Learning Tree, Trees for Tomorrow, Tree Farm, and Tree Farm Family. They are also expected to maintain a strong liaison with the University of Wisconsin System and private educational institutions for forestry and wood product research; a part of which will be for I&E activities.

The major private non-industrial ownership groups with an interest in promoting forestry have been identified as the Wisconsin Woodland Owners Association (WWOA) and Soil and Water Conservation Districts (SWCD). Neither group has a well-defined I&E program for forestry although both recognize the importance of the managed forest. Opportunities for added involvement in I&E activities rest largely within their own memberships and internal communications systems. An increase in WWOA membership from an estimated 1,000 members in 1981 to 5,000 in 1985 will in itself serve as a formidable information and education acceleration effort. Likewise, an approximate

25,000 membership increase (from an estimated 75,000 members to 100,000) among SWCD cooperators during the same time period will increase the number of that organizations landowner contacts and I&E program effectiveness. A large part of SWCD's cooperator increase is expected from a proposed legislative change in the statewide organization of the SWCD responsibilities. The changes would transfer many program responsibilities to the counties.

In general, all of the I&E opportunities presented for the several interest groups must depend on the media (newspapers, radio, TV, etc.) to a considerable extent to be reasonably successful. These groups must also be willing to divert more personal and/or staff time and budget to I&E activities. And, all of the efforts need to be coordinated to avoid duplication of effort and to assure that the information transmitted is timely, consistent, and up to date.

PLATE: Information and Education Activities by Major Interest Group

Interest Group	Activities				
	Training[1]	Demonstration	Personal Contact	Media	Teaching
Federal					
U. S. Forest Service	X	X	--	X	--
Soil Conservation Service	--	--	X	--	--
State					
U. of W. Extension	X	X	X	X	X
Dept. Natural Resources	--	X	X	X	--
Dept. of Development	--	--	--	X	--
Dept. Public Instruction	X	--	--	--	X
Board of Voc., Tech. & Adult Education	--	--	--	--	--
Private					
Forest Industry	--	X	X	X	--
Non-Industry[2]	--	X	X	X	--
Other[3]	--	--	--	X	--

[1]Training of foresters to be more effective in the I&E effort.
[2]Wisconsin Woodland Owners Assoc., Soil & Water Conservation Districts, etc.
[3]Conservation Congress, professional organizations, and volunteer groups.

Source: Forest resource planning analysis, 1981.

PLATE:

Wisconsin Forestry Extension Program Matrix

PROGRAM AREA	PRIORITY	ACTIVITIES REQUIRING LONG-TERM EFFORT[a/]	ACTIVITIES REQUIRING MEDIUM-TERM EFFORT[a/]	ACTIVITIES REQUIRING SHORT-TERM EFFORT[a/]
I. Forest Resources Management	1st	2-Forest management demonstrations 3-Analytical tools for forest management 4-Forest management in farm planning 5-Feedback for research/service staff	1-Forest resource use for mass media 6-Forest ecology education 7-*Forest entomology & pathology education*[b/]	none
	2nd	10-*Wildlife management education*	8-County forest data interpretation 9-Programs for absentee landowners 11-Alternative forest crops	11-*Forest hydrology education* 12-Forest tree improvement education 14-*Absentee landowner lists*
II. Forest Products (Primary)	1st	1-Environmental quality requirements 2-Mill management & material conversion 3-Products utilization for mass media 4-Feedback for research and service staffs	none	none
	2nd	6-Training for industry personnel	7-OSHA requirements	5-Comprehensive county mill data
III. Forest Resource Planning	1st	1-Assistance for county forest plans 4-Forest resource issues	2-Assessment of state resource needs 3-Forest resource planning data	none
	2nd	none	5-Resource survey data for mass media 6-Public understanding of county forests	none
IV. Youth	1st	1-Leadership training materials 2-Educational literature for 4-H/school use	none	none
	2nd	4-Educational programs and free trees	3-Forest resources for mass media	none
V. Harvesting	1st	1-Environmental quality standards 3-Improved techniques and systems	2-Information for mass media	none
	2nd	4-Product standards, grading, & metrication 6-*Improved business management*	5-Woods safety and OSHA requirements	none
	3rd	none	7-Training for woodsworkers & truckers	none
VI. Forest Products Marketing	1st	1-Forest products price reports	2-Forest products outlooks 3-Metrication	none
	2nd	5-*Business management*	4-Product grade specifications 6-Marketing information for mass media	none
VII. Ecology-Silviculture	1st	none	2-Research/service liason 3-Effects of environmental factors	1-Forest ecology fact sheets
	2nd	none	4-Landowners' conferences & workshops 6-Ecological effects of logging	5-Forest ecology vignettes for mass media
VIII. Forest Products (Secondary)	1st	none	none	none
	2nd	2-Energy, environmental quality, & OSHA 3-Mill management 4-Lumber seasoning practices	1-Optimum lumber recovery	none
IX. Forest Policy & Taxation	1st	1-Consultation for bills, codes, & ordinances	none	none
	2nd	3-Implementation of legislation & codes	2-*Public policy matters*	none
X. Urban & Community Forestry	1st	1-*Community tree problems* 2-Full utilization of community forests	none	none
	2nd	5-*Trees in state/community projects*	6-*Value of trees in communities*	3-Forest resources for schools 4-*Use & protection of trees*
	3rd	none	7-*Service & maintenance crew training*	none
XI. Outdoor Recreation	1st	1-Information/demonstration for multiple use	none	none
	2nd	none	3-*Site development, use, & maintenance*	2-*Evaluating recreational potential*
	3rd	4-*Business management*	none	5-*Recreational pursuits*

[a/] Activities are abbreviated; see main document for descriptive information.

[b/] Italicized activities imply cooperative Forestry staff involvement, but not major internal responsibilities.

PLATE: Current (1980) and Proposed (1985) I&E Programs for Major Interest Groups.

Interest Group	Program Person Years			Estimated Costs (Thousands of $[1])					
				For Person Years			Support Costs		
	Current	Proposed Additions	Total	Current	Proposed Additions (1985)	Total	Current[3]	Proposed Addition (1985)	Total of All Costs (1985)
Federal									
U. S. Forest Service	3	1	4	120	50	160	25	29	189
Soil Conservation Service	.5	1	1.5	20	40	60	--	--	60
State									
U. of W. Extension[2]	5	4	9	200	360	560	5	20	580
Dept. Natural Resources	4	1	5	80	20	100	5	10	110
Dept. of Development	.5	--	.5	10	--	10	--	--	10
Dept. Public Instruction	1.0	--	1.0	40	--	40	--	40	40
Private									
Forest Industry					- Unknown -				
Private, Non-Industry					- Unknown -				

[1]Based on 1980 dollar values
[2]Covers only those Extension objectives relating to multiple use, private non-industrial ownership, urban forestry harvesting and marketing, processing, and wood as energy.
[3]Includes $5M/year estimate of I&E materials from State and Private Forestry.

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Other Forest Resource Programs

Three of the issues addressed in this planning process dealt with public concerns that were later found to be posing little immediate threat to the forest resource or were of greater consequence to the utilization of the products of the forest than to the resource itself. The issues in question are related to mining, the disposal of wastes and transportation systems.

*Mining

The current and estimated future effects of metallic and non-metallic mining on the forests of Wisconsin are considered negligible at the present time largely because of state imposed constraints on mining activities and the dearth of information on the abundance and location of non-metalic mineral deposits. Most public and private ownerships have a reasonably favorable attitude toward mining operations recognizing their importance as a positive influence on the state's economy and because they can be regulated in a manner as to substantially reduce their negative social and environmental affects.

Concerns have been varied regarding uranium mining. For the present, however, these concerns cannot be addressed because Wisconsin has yet to record a uranium discovery. Public concern has been largely directed at uranium prospecting and the safeguards needed in the event a discovery is made. Neither of these concerns has been shown to have a direct affect on other forest resources, including timber.

Peat mining in forested areas has the potential to become the most controversial of mining related issues. However, intensive peat mining is not expected to be of much consequence until peat becomes popular as an energy source. Even then, the controversy will likely be centered on its environmental affects rather than on the influence it exerts on commercial forest land. Therefore, in a strict timber production sense, peat mining is not expected to be of much concern to forestry interests.

The influence of mining on the price of forest land, and following ad valorem taxes, was at first thought to be in conflict with timber production interests. This concern was, under closer scrutiny, found to be not well founded despite the fact that mining land speculation in the 1970's in parts of northern Wisconsin had pushed land prices upward for a brief period of time. These land prices have since reverted back to normal in most areas as the unknown factors, location and quantity of mineral deposits, pose too great a risk for the long term speculator.

On a more positive note, it has been pointed out that an upswing in mining activity in northern Wisconsin may serve to save at least some of the branchline railroad corridors from abandonment and thereby facilitate continued rail movement of raw and manufactured timber products. The present volume of products (all products) moved by rail is inadequate to warrant continued rail service on many branchlines.

No specific mining program will be developed for the various commercial forest land ownership categories until such time as enough information is available to make a reasonable assessment of the affects of mining on the resource. Nevertheless, as was emphasized in the mining issue, there are some measures that ought to be put into effect in the interim. They include:

1) blocking in of mineral rights ownership by the public sector,
2) development of a public land management policy defining where and how mining can take place, and
3) promotion of interagency planning and coordination for mineral exploration and development

Another important action, not exclusive to mining, in need of implementation at the earliest possible date involves the monitoring of the forest resource base for the affects of land use (management) decisions that are made relative to it. It is through such a monitoring procedure that threats to the forest resource can be identified and addressed quickly and efficiently.

No long range programs for mining within the state's commercial forest acreage will be made at this time from the perspective of forest resource planning.

*Waste Disposal

This program deals with hazardous and nonhazardous waste materials disposal within the forests of Wisconsin as currently understood and perceived for the future.

The Current Situation

There now are few problems related to forest land waste disposal in this state. Those which do occur are largely associated with illegal dumping of hazardous and nonhazardous materials and are beyond the capability of the landowner or land manager to resolve.

Perhaps the best reasons for the forests being in this enviable position rests with their usual remoteness from the people who generate the waste and their high value for other purposes when near population concentrations. It is also possible that much of the forest land remaining after the majority of the land in southern Wisconsin was cleared for farming and urban development is not well suited to disposal site use. In addition, legal constraints, particularly on public lands, serve to inhibit disposal site use.

The Future Situation and Program

Most of the concern expressed for future forest land waste disposal in the future involves hazardous nuclear wastes. Sixteen of the state's northern, and heavily forested, counties have been identified as having potential for radioactive waste site location by the Department of Energy. Further, the State of Wisconsin has recognized these and additional northern counties as having suitable sites for low level radioactive waste disposal. The possibility of using Wisconsin's forests for disposal of other harmful wastes in the future is also good.

Nonhazardous solid waste disposal in the state's forested areas is not expected to be of measurable consequence to the year 2000 because of reasons previously cited under the current situation and because there is no economical way of transporting the materials over the distances required. Also, the disposal of municipal waste water will have inconsequential adverse affects (sometimes beneficial) on the forests during the same time period.

It is not likely waste disposal in the forests will result in negligible losses of timber productivity in the near future. It may, however, result in serious negative influences on recreational use and wildlife production if the disposal sites are numerous and widespread. Losses of these values may be especially significant in the event of hazardous waste disposal.

There is a need for all forest ownerships to develop rational policies toward waste disposal to:

1. assure the proper location of future disposal sites,
2. keep its negative affects on other forest values to a minimum,
3. protect ground and surface waters against contamination,
4. assure that the sites will be properly reclaimed following abandonment, and
5. make certain that the economic and social values, including health of residents, are not threatened.

A further program for waste disposal on forested lands cannot be made in the absence of information on the type and magnitude of disposal proposals.

*Transportation

The issue related to the transportation of roundwood products concluded that highway (truck) transport is, and will continue to be, the primary method by which timber will be moved from the location of harvest to place of primary processing within the State of Wisconsin. The demise of branchline railroads and the more reasonable costs of highway transport are largely responsible for this conclusion. All other means of transporting timber are considered infeasible now.

Railroads

Railroads are unable to provide full service to timber producers because the total volume of rail hauled products in the state's northern forested regions is inadequate to sustain rail operating and maintenance costs. To continue rail operations would require a government subsidy or an increase in freight rates, the latter an alternative that would only serve to increase the attractiveness of lower cost truck hauling. There is no doubt, however, that high volume rail hauling can be cheaper and less fossil fuel consumptive than truck hauling.

Future Opportunities for rail hauling raw wood rest largely with the continuation of mainline railroads and the continuation of, or creation of, key branchlines that facilitate the flow of raw wood products to mainline rights of way. Approximately four branchlines running generally north and south with properly spaced wood collection terminals would substantially improve delivery capabilities from the vast northern timber producing region. The greatest benefactor of such a system would be the pulp and paper industry. Secondary benefits would accrue to other wood using industries distributed throughout the north not only in the acquisition of raw materials but also in the distribution of their manufactured products.

The preceding program would require a financial and moral commitment on the part of the railroads to provide good service, an organization of the collection terminals by logging coalitions or private interest groups and, perhaps, a state or federal subsidy to assure continuing operations. It should be noted that collection terminals and rail services may be used by industries other than timber producers to make the entire operation more profitable. A feasibility study of any alternative for continuing rail service in northern Wisconsin is imperative.

Highways

Wisconsin has an elaborate system of highways provided by federal, state, county and town highway agencies. There are about 105,000 miles among all systems allowing for a dispersal of wood using industries and good opportunities for dispersed wood flow. In fact, a part of the problem of rail transport rests with the dispersed nature of industries. Had they been geographically concentrated, industries could have been better served by rail, both in the delivery of raw materials to the industries and in the distribution of the manufactured product. A dispersed industry, good roads, and a remote resource combine to make truck hauling the most convenient means of currently delivering roundwood products in the state.

Future opportunities for truck hauling are good as long as the high quality of highway system is maintained and truck operating costs remain at reasonable levels. An escalation of fuel and lubricant costs or a shortage of either product could restrict the activity. Most of the increased costs, including costs of repairing truck damaged highways, would ultimately be passed along to the consumer. The affects of increased wood fiber product costs may be of sufficient importance to force society into a more efficient alternative means of fiber transporation.

Forest Road Systems

A part of the transport of timber from woods to market, not covered by the transportation issue, concerns the accessibility and movement of timber within large public and private ownerships. Briefly stated, the absence of good access restricts the ability of timber managers to effectively carry out harvest, improvement and resforestation projects. Inadequate access also limits recreation and wildlife management opportunities. The U.S. Forest Service has established and effective access development program that could serve as a model for other ownerships.

Future opportunities for resolving this internal transportation concern include the preparation of conceptual road system plans for individual state and county forests, adoption of policies regarding operations and maintenance, establishment of a road classification system, and establishment of a means of funding for operations, maintenance and development. A cost/benefit analysis, including the setting of priorities for investment, needs to be a part of each road system plan. The analysis must relate to the best timber management opportunities, the need to protect special plant and animal communities, outdoor recreation potentials, wildlife management opportunities and needs for soil and water protection. Statewide goals and objectives and programs identified in this plan (A Plan for Wisconsin's Forest Resources) need to be considered in the establishment of access alternatives.

All public forests should have comprehensive accesss plans and supporting cost/benefit analyses operational by the year 1988.

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Appendix B

Insect and Disease Pests Threatening Timber Production In Wisconsin's Forests (by Tree Species)

SOFTWOODS

White Pine

White pine weevil
Introduced pine sawfly
White pine blister rust

Jack Pine

Jack pine budworm
Pine tussock moth
Pine engraver beetle
Stem rust

Spruce-Fir

Spruce budworm

Red Pine

Redheaded pine sawfly
Saratoga spittlebug
Zimmerman pine moth
Pine engraver beetle
Pine tussock moth
Red pine sawfly
European pine sawfly
Red pine needle midge
Shoestring root rot
Red pine shoot blight
Scleroderris canker
Sirococcus shoot blight?

Larch

Larch sawfly
East larch beetle

HARDWOODS

Aspen

Forest tent caterpillar
Large aspen tortrix
Hypoxylon canker
White trunk rot

White Birch

Bronze birch borer
Birch leaf miner
White trunk rot

Northern Hardwoods

Forest tent caterpillar
Leafrollers (several)
Basswood thrips

Oak

Oak grass hopper
Cankerworms
Twolined chestnut borer
Walkingstick
Oak leaf tier
Leafrollers (several)
Gypsy moth
Oakwilt
Shoestring rootrot

Source: DNR Forest Pest Control

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